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# Human factors analysis and modeling of U.S. Navy afloat electrical shock mishaps

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# NAVAL POSTGRADUATE SCHOOL
## Monterey, California

# THESIS

**HUMAN FACTORS ANALYSIS AND MODELING OF U.S. NAVY AFLOAT ELECTRICAL SHOCK MISHAPS**

by

M. Scott Sciretta

March 1999

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Electrical shock mishaps account for 33 percent of all personnel injuries occurring onboard U.S. Navy surface combatants from 1995 to 1997. Clearly this indicates a need to identify the root causes and to develop intervention strategies for preventing electrical shock. Electrical shock root causal factors are identified through the evaluation of Special Case Mishap Reports maintained by the Naval Safety Center. Analysis indicates that over 85 percent of electrical shock mishaps are human factors related. Scenario analysis coupled with categorical data analysis is used to identify human factors patterns that are present in electrical shock mishaps. This human factors approach finds that the failure of two primary human factors related interventions identified in the safety literature, improper tagout of equipment and misuse of personal protective equipment, account for 37 percent of the mishaps. A stochastic model of electrical shock mishaps, including human factors related and non-human factors related mishaps, is constructed to develop an overall impression of the status quo. This model is then used to forecast the impact of correcting the identified failed interventions on future expected mishap frequencies and associated costs.

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**HUMAN FACTORS ANALYSIS AND MODELING OF U.S. NAVY AFLOAT ELECTRICAL SHOCK MISHAPS**

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Submitted in partial fulfillment of the
requirements for the degree of

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## ABSTRACT

Electrical shock mishaps account for 33 percent of all personnel injuries occurring onboard U.S. Navy surface combatants from 1995 to 1997. Clearly this indicates a need to identify the root causes and to develop intervention strategies for preventing electrical shock. Electrical shock root causal factors are identified through the evaluation of Special Case Mishap Reports maintained by the Naval Safety Center. Analysis indicates that over 85 percent of electrical shock mishaps are human factors related. Scenario analysis coupled with categorical data analysis is used to identify human factors patterns that are present in electrical shock mishaps. This human factors approach finds that the failure of two primary human factors related interventions identified in the safety literature, improper tagout of equipment and misuse of personal protective equipment, account for 37 percent of the mishaps. A stochastic model of electrical shock mishaps, including human factors related and non-human factors related mishaps, is constructed to develop an overall impression of the status quo. This model is then used to forecast the impact of correcting the identified failed interventions on future expected mishap frequencies and associated costs.

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# LIST OF ACRONYMS

| | |
|---|---|
| CGUS | Comptroller General of the United States |
| CNO | Chief of Naval Operations |
| CYxx | Calendar Year xx |
| CYxx$ | Constant Year xx Dollars |
| DOD | Department of Defense |
| DON | Department of the Navy |
| FAT | Fatality |
| MSC | Military Sealift Command |
| NAVOSH | Navy Occupational Safety and Health |
| NAVSAFECEN | Naval Safety Center |
| NSC | National Safety Council |
| NCIS | National Council of Industrial Safety |
| OSHA | Occupational Safety and Health Administration |
| PPD | Permanent Partial Disability |
| PTD | Permanent Total Disability |
| PPE | Personal Protective Equipment |
| SECNAV | Secretary of the Navy |
| SCM | Special Case Mishap |
| TAR | Training and Administration of the Reserves |
| USNS | United States Naval Ships |

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## EXECUTIVE SUMMARY


Personnel fatalities and injuries can dramatically affect U.S. Navy unit mission capability and operational readiness. Notably, electrical shock mishaps account for 33 percent of all personnel injuries occurring onboard U.S. Navy surface combatants from 1995 to 1997. Clearly this indicates a need for root cause identification and development of intervention strategies to prevent electrical shock. Post-hoc analysis of 897 Special Case Mishap Reports maintained by the Naval Safety Center, involving 927 personnel receiving an electrical shock from 1 January 1995 to 31 December 1997 is conducted in response to this need. The analysis includes initial data exploration, a human factors analysis, and stochastic modeling.

Clearly, initial data exploration and a human factors analysis permits salient features and predictive patterns to be identified in electrical shock mishaps. Aircraft Carriers, possessing the largest crew of any naval vessel, account for the highest number of mishaps (32.0%). The E-3, E-4, and E-5 rates are typically those that perform maintenance or other work activity with associated electrical hazards, and are the most common victims of electrical shocks (76.3%). The Navy's "electrical ratings", EM, AT, and ET, are 3 of the top 4 ratings involved in electrical shock mishaps. The fourth rating, MM, routinely works with electrical components or hazards in the engineering spaces.

The human factors concept of scenario analysis is invaluable in determining the root causes of electrical shock mishaps. Most victims (37.0%) are found to be not following rules and regulations since the two primary human factors causes relate to failed electrical hazard interventions: improper tagout of equipment and misuse of PPE. In addition, many personnel (21.5%) are not taking shipboard safety regulations seriously

since a victim's inattentiveness, complacency, or violations account for a significant number of the remaining events.

Stochastic modeling is a valuable tool and proves statistically that the mishap arrival process can be estimated. As demonstrated in previous mishap studies, modeling mishap events using a Poisson process is an effective technique. Once constructed, the model provides the means to predict expected future mishap frequencies and associated costs. The impact of correcting failed electrical hazard human factors related interventions, on future mishap frequencies and associated costs, can be evaluated using the electrical shock mishap model formulated. This study indicates mishap events can be reduced by 19 percent (56 events) in one year with a 50 percent reduction in the failure of personnel to wear PPE or properly tagout equipment. In addition, the model indicates personnel injury costs alone will total over $1,000,000 in the next 5 years without interventions.

Post-hoc mishap analysis is only as good as the initial mishap report. The current instruction governing afloat mishap investigation and reporting, OPNAVINST 5100.19C, provides a format for reporting what happened but lacks direction on reporting why the mishap occurs. Since this research shows over 85 percent of electrical shock mishaps are attributable to human error, the why of a mishap is necessary to conduct a human factors analysis for root cause identification. It is recommended that NAVSAFECEN revise OPNAVINST 5100.19C and provide better guidance for reporting why the mishap occurred.

NAVSAFECEN should continue their outstanding approach in providing the fleet with shipboard safety issues through Ship's Safety Bulletins issued monthly and their award winning Fathom Magazine issued bi-monthly. For the prevention of electrical shock mishaps, the bulletins and magazines can focus on the Navy's Tagout and PPE Programs in addition to basic shipboard electrical safety. NAVSAFECEN has already commenced this approach and initial data exploration of CY98 data indicates a reduction in the average number of electrical shock mishap events occurring onboard surface combatants.

Finally, there are other high interest personnel injury mishaps that can be pursued. Back injury and toxic substance exposure contribute significantly to the total number of mishaps occurring annually onboard Navy surface combatants. This research indicates mishap events can be stochastically modeled, and through human factors analysis, root causes of mishaps can be identified and subsequently, intervention strategies can be considered, implemented, and evaluated for their effectiveness on future mishap frequencies and associated costs.

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# I. INTRODUCTION

## A. OVERVIEW

As the U.S. Military moves into the new millennium, technological advances of the twentieth century have enhanced overall force combat readiness. Operational commitments, combined with major draw-downs and budget constraints, heighten the importance of asset availability and preservation. Under such conditions much attention is given to the loss and damage of capital resources, such as aviation and maritime assets, however, relatively little attention is given to personnel fatalities and injuries. Daily, Naval personnel fatalities and injuries occur in a variety of routine activities due to the hazards they are confronted with in the workplace (Naval Safety Center, 1998). Numerous private industry studies indicate that job related fatalities and injuries can be reduced through human factors analysis, which is not only cost effective but humanitarian as well (Drury & Brill, 1983).

Personnel injuries can dramatically affect U.S. Navy unit mission capability and operational readiness. Notably, electrical shock mishaps account for 33 percent of all personnel injuries occurring onboard Department of the Navy (DON) combatants from 1995 to 1997. Clearly this indicates a need to prevent electrical shock through root cause identification and the advent of tailored intervention strategies. The intent of this study is to identify electrical shock incident root causes through the evaluation of Special Case Mishap Reports, and once identified, model the occurrence of electrical shock, identify those incidents with human factors root causes, select interventions for them, and estimate their potential impact on future mishap frequencies and associated costs.

Traditionally, accident investigation and analysis focused solely on personnel, particularly those who might be accident prone and blamed for them (Pimble & O'Toole, 1982). More recently, accident investigators tend to be operators and engineers rather than trained human factors professionals, who focus their attention on carelessness, inattention, etc., that lead to mishaps. The combination of their two perspectives has precluded effective post-hoc accident data analysis and prevented the determination of the root causes of accidents (Shappell & Wiegmann, 1997a).

Numerous techniques have been used to pinpoint accident causation. Techniques range from basic statistical analysis of categorical data to the development of a full-blown model of accident occurrence (Ramsey, 1973). These analyses tend to be static and usually do not capture the dynamics of the accident itself (Laughery, Petree, Schmidt, Schwartz, Walsh & Imig, 1983). Through a systematic examination of accident analysis, the "how" of a mishap sequence can be identified. Classic human factors techniques are based on task analysis, which depicts the sequence of events for a work activity and provides such a perspective.

One effective human factors technique is scenario analysis, which uses a task analytic process to examine human factors data in accident cases to identify hazard patterns or "scenarios" (Drury & Brill, 1983). Scenario analysis of 1,874 industrial accidents occurring at a large petro-chemical manufacturing complex found that machinists and pipefitters account for almost 25 percent of the accidents while assembling or disassembling equipment (Laughery et al., 1983). Another scenario analysis of 448 eye injury cases indicates over 95 percent of personnel suffering eye injuries complied with the company's area based protective wear policy (Schmidt, Petree

& McDaniel, 1984). A follow-on scenario analysis of 229 back injuries found that 72 percent of the injuries are a direct result of overexertion (Laughery & Schmidt, 1984). Finally, a scenario analysis of 4,923 industrial accidents identifies five scenarios, which account for over 16 percent (804) of the accidents (Laughery & Brems, 1985). The common foundation is that all these studies of injuries in the petro-chemical industry are able to identify very clear-cut patterns among the data sets analyzed, which produces an understanding of an accident event's dynamics, the first crucial step in classifying root human cause factors. Once these factors are classified, they can be modeled, and subsequently potential intervention strategies can be evaluated to assess their impact on future accident frequencies, rates, and costs.

## B. BACKGROUND

The Naval Safety Center (NAVSAFECEN), which is located at the Norfolk Naval Air Station, Virginia, has three directorates: aviation, afloat, and shore safety, and five support departments. The directorates work both independently and as a team to help the Chief of Naval Operations and the Commandant of the Marine Corps prevent operational mishaps, promote safety, and monitor safety programs. Through their involvement in all phases of safety, NAVSAFECEN develops recommendations for formulating safety policy necessary to maintain the highest level of combat readiness (NAVSAFECEN, 1997).

NAVSAFECEN staff collects, evaluates and distributes information about operational and occupational mishaps. The command maintains a computerized repository of injury, occupational illness, and property damage reports as well as publishes statistical data derived from those reports. Some staff members directly or indirectly assist in incident investigations to determine causes and subsequently to recommend policies that will prevent similar ones in the future. Several NAVSAFECEN personnel also conduct safety surveys of operational commands to evaluate their safety programs and practices to make recommendations for improvements (Ibid, 1997).

Recently, Lacy (1998) conducted a human factors analysis of major U. S. Navy afloat (e.g. ships and submarines) mishaps. His study focuses on Class A afloat mishaps and encompassed 46 mishaps over a four-year period involving a combination of ship collisions, vessel groundings, and personnel fatalities. The Navy classifies mishaps according to accident severity, and mishaps are classified as Class "A", "B", or "C", depending on the dollar value reached and/or involvement of personnel fatalities/injuries (see definitions page 6). Specific human causal factors contributing to the occurrence of mishaps are identified, underscoring a need to incorporate a human factors approach in mishap data analysis. He asserts once such causal factors are identified, tailored intervention strategies can be developed and implemented to potentially prevent related mishap occurrence. He provides NAVSAFECEN with recommendations for revisions to the Navy's instruction governing mishap investigation and reporting (DON, 1997a), to assist investigators in analyzing afloat mishaps and their subsequent development of tailored interventions.

Currently, there is an extreme interest in a separate type of afloat incidents, known as Special Case Mishaps (SCM's). SCM's involve: (1) electrical shock; (2) hazardous material, chemical or toxic exposure requiring medical attention; (3) back injury requiring medical attention; and (4) explosives, oxidizers, incendiaries, explosive systems or chemical warfare agent incidents (DON, 1997a). SCM's may be classified as

Class A, B, or C, depending on the severity of the incident, however most do not reach those levels. Mainly they involve personnel injuries at a rate of roughly 300 mishaps per category per year. Although SCM's are primarily Class C or less in severity, their impact on personnel and combat readiness is significant (CDR Rowe, personal communication, May 20, 1998).

Aside from taking a human factors perspective in conducting mishap data analysis, the use of modeling procedures in concert with it is being embraced. Schmorrow (1998), in an analysis of maintenance related mishaps, uses a human factors analysis approach to identify patterns and potential interventions. Subsequently, he estimates the impact of those human factors interventions through stochastic modeling techniques. His models indicate that reducing human error types as low as 10 percent can result in a savings in excess of millions of dollars per year. Such a process has long been called for in the literature (Mintz, 1954; Teel & Du Bois, 1954).

## C. OBJECTIVE

The purpose of this study is to conduct a human factors analysis of electrical shock mishaps to identify salient patterns present in electrical shocks. Further, electrical shock mishaps are stochastically modeled and subsequently used to evaluate the potential impact of intervention strategies on mishap event frequencies and associated costs.

## D. PROBLEM STATEMENT

This research addresses electrical shock mishaps and their affect on the operational readiness of U.S. Navy ships. The study identifies the human causal factors contributing to electrical shocks and investigates the following questions:

1. Can electrical shock mishaps be classified through human factors analysis, permitting salient features and predictive patterns to be identified?
2. Can a stochastic model of electrical shock mishaps, composed of human factors involvement/non-involvement, be constructed to model the status quo?
3. Can potential intervention strategies be identified for the primary human factors patterns found?
4. Can the intervention strategies for human factors related electrical shock mishaps be evaluated through modeling to assess their subsequent impact on mishap frequencies and associated costs?

## E. DEFINITIONS

This study uses the following definitions (DON, 1997a):

1. Class "A" Mishap. A mishap involving one or more of the following: (1) $1,000,000 in property damage; (2) loss of life; (3) permanent disability.
2. Class "B" Mishap. A mishap involving one or more of the following: (1) between $200,000 and $1,000,000 in property damage; (2) permanent partial disability; (3) hospitalization of five or more people.
3. Class "C" Mishap. A mishap involving one or more of the following: (1) between $10,000 and $200,000 in property damage; (2) an injury preventing an individual from performing regularly scheduled duty or work beyond the day or shift on which it occurred; (3) nonfatal illness or disability causing loss of time from work or disability at any time (lost time case).
4. Class "D" Mishap. Special Case Mishaps not meeting the reporting criteria of Class A, B, or C.

## F. SCOPE AND LIMITATIONS

This study examines all reported electrical shock incidents occurring onboard U.S. Navy ships to both active duty, training and administration of the reserves (TAR), and reservist personnel in the U.S. Navy and U.S. Marine Corps between 1 January 1995 and 31 December 1997. The focus of this study is electrical shock incidents attributable to human causal factors. The intent of the next chapter is to provide a framework for understanding the occurrence and prevention of electrical shock mishaps onboard U.S. Navy surface ships. Chapter III provides a discussion of the methodology used in this study. Results of data exploration, human factors analysis and stochastic modeling are provided in Chapter IV. Finally, a research summary, conclusions, and recommendations are provided in Chapter V.

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# II. LITERATURE REVIEW

## A. OVERVIEW

The intent of this chapter is to provide a framework for understanding the occurrence and prevention of electrical shock mishaps onboard U.S. Navy surface ships. Thus, a detailed review covering the subjects of accident prevention, causation, investigation, reporting, and analysis is provided. The Occupational Safety and Health Act and the Department of the Navy Occupational and Safety Health Program are then covered. Finally, an in-depth review is provided on electrical hazards and safety.

## B. ACCIDENT

McElroy (1974) defines an accident in its broad scope as:

> An unplanned, not necessarily injurious or damaging event, that interrupts the completion of an activity; it is invariably preceded by an unsafe act or an unsafe condition or both, or some combination or unsafe acts and/or unsafe conditions. (p. v)

This research focuses on personnel injury and considers a more specific definition of an accident as defined by Heinrich, Peterson, and Roos (1980):

> An unplanned and uncontrolled event in which the action or reaction of an object, substance, person, or radiation results in personal injury or the probability thereof. (p. 23)

Clearly, the prevention of accidents is a desirable goal in any organization (Lacy, 1998).

## C. ACCIDENT PREVENTION

Hammer (1976) contends safety programs are undertaken to prevent accidents for three fundamental reasons:

1. Moral: accident prevention is undertaken to prevent injury to personnel purely as the result of humane considerations.
2. Legal: federal, state, and municipal requirements must be observed or penalties may be assessed for noncompliance.

3. Economic: consideration is given to those monetary losses which could result from injury to personnel and, in addition, from property damage, destruction of material, interruption of operations, and other factors. (p. 8)

However, this has not always been the case. In 1893, for example, during the consideration of the Railway Safety Act, a company executive stated that it would cost less to bury a man killed in an accident than to put air brakes on a car (Hammer, 1976). One hundred years later such a statement would be considered a blatant disregard for human life and lead to serious legal trouble. During the Industrial Revolution hazardous working conditions were the accepted norm. Today, failure to try to prevent injuries to employees would be viewed as indefensible in court (McElroy, 1974).

The first factory safety inspections did not occur until 1867 in Massachusetts and were driven by protests of dangerous machinery creating hazardous working conditions. From 1867 until 1912 little progress was made in industrial safety with the exception of the first officially recorded safety program in 1892 and the idea of workers compensation in 1908. In 1912 the First Cooperative Safety Congress met in Milwaukee, and as a result the modern safety movement was born in 1913 with the formation of the National Council of Industrial Safety (NCIS). NCIS changed its name to the National Safety Council (NSC) in 1915 and broadened its program to include all aspects of accident prevention (McElroy, 1974).

The balance of the early 20$^{th}$ century saw the federal government begin to actively lobby for industrial safety. The major emphasis of this era was on the "Three E's of Safety" – engineering, education, and enforcement, which were incorporated into early safety programs. Engineers focused on design improvements, in both product and process, whereas industries reached their employees through education and the enforcement of established safety rules (Goetsch, 1996). The work of a few individuals devoted to industrial safety with the NSC's birth grew to millions by 1950. McElroy (1974) depicted the impact of the safety movement by the end of World War II with a quote by retired Admiral Ben Moreell, the then president of Jones and Laughlin Steel Corporation: "If we can't afford safety, we can't afford to be in business." (p. 7)

Today, NSC is the largest organization in the United States devoted solely to health and safety practices and procedures (Goetsch, 1996). As a result of NSC's efforts in the 20th century, an employees chances of being killed in an industrial accident are less than half they were 60 years ago (Society of Manufacturing Engineers, 1989). The current death rate from work-related injuries is approximately 4 per 100,000, less than a third of the rate 50 years ago (NSC, 1990). However, in the United States there are an estimated 100,000 people accidentally killed and over 104 million accidentally injured at a cost of over 90 billion dollars each year (Ferry, 1988). Therefore, given the still high number of fatalities and injuries, there is a clear need for the sustained development of accident prevention strategies.

## D. OCCUPATIONAL SAFETY AND HEALTH ACT

Prior to 1970, few laws existed governing health and safety in an occupational environment. In 1957, the manufacturing injury rate was 11.1 lost-time injuries per million man-hours and by 1970 this rate had risen to 15.2 (Smith, 1976). In addition, the United States faced the following annual occupational figures in 1970 (U.S. Department of Labor, 1995):

1. Job-related accidents accounted for more than 14,000 worker deaths
2. Nearly 2 ½ million workers were disabled
3. Ten times as many person-days were lost from job-related disabilities as from strikes

4. Estimated new cases of occupational diseases totaled 300,000 (p. 1).

The U.S. Congress, concerned with this declining trend of health and safety standards for employees, passed the Occupational Safety and Health Act of 1970. The purpose of the act as cited by McElroy (1974) was "to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources" (p. 21). The act was signed into law by President Nixon on 19 December 1970 and took effect 28 April 1971.

"OSHA" or the Occupational Safety and Health Administration was established in 1970 as part of the 1970 Act and serves as the federal government's administrative arm under the U.S. Department of Labor (Goetsch, 1996). Pressured by Congress and labor groups on one hand to provide the highest degree of health and safety and by businesses on the other who bear the monetary costs of programs, OSHA is faced with a very difficult task (Smith, 1976).

The OSHA Act applies to any employer with one or more employees, with the exception of those who are self-employed persons, work on family farms who employ only immediate family members, and federal agencies covered by other federal statutes (U.S. Department of Labor, 1995).

Goetsch (1996) summarizes OSHA's mission and purpose as follows:

1. Encourage employers and employees to reduce workplace hazards
2. Implement new health and safety programs
3. Improve existing health and safety programs
4. Encourage research that will lead to innovative ways dealing with workplace health and safety problems
5. Establish the rights of employers regarding the improvement of workplace health and safety
6. Establish the rights of employees regarding the improvement of workplace health and safety

7. Monitor job-related illnesses and injuries through a system of reporting and record keeping
8. Establish training programs to increase the number of health and safety professionals and to continually improve their competence
9. Establish mandatory workplace health and safety standards and enforce those standards
10. Provide for the development and approval of state-level workplace health and safety programs
11. Monitor, analyze, and evaluate state-level health and safety programs (p. 52).

These goals enable both employees and employers to understand their rights and responsibilities pertaining to safety. Through the enforcement of these standards, effective safety programs can be established providing both a safe working environment for the employees and a cost-effective and moral business operation for the employer.

Prior to the establishment of OSHA, no centralized database of occupational safety and health issues was maintained for analysis. The OSHA Act mandates records of occupational injuries and illnesses be maintained. An occupational injury, as defined by the U.S. Department of Labor (1995) is "any injury such as a cut, fracture, sprain or amputation that results from a work-related accident or from exposure involving a single incident in the work environment" (p. 12) and an occupational illness is "any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment" (p. 12). OSHA requires:

> All occupational illnesses must be recorded regardless of severity. All occupational illnesses must be recorded if they result in:
> 1. Death
> 2. One or more lost workdays
> 3. Restriction of work or motion
> 4. Loss of consciousness
> 5. Transfer to another job
> 6. Medical treatment (other than first aid) (p. 13).

Through the collection of these health and safety statistics, OSHA has formed a centralized database for the analysis of accident records and the development of subsequent intervention strategies to prevent future occupational accidents.

The problem is studies indicate OSHA is not making use of its database. The Comptroller General of the United States (CGUS) (1979), in a report to the Congress, indicated "OSHA has information in its files on the causes of serious work-related accidents yet is not using this to develop measures to prevent accidents from recurring" (p. i). The CGUS contends that the coding scheme OSHA uses to enter accident data into its database does not provide the detail required to identify accident causes and trends accurately. The CGUS recommends OSHA refines its data collection system and makes greater use of information pertaining to serious accidents through revised reporting procedures, the establishment of hazard lists warranting special attention, and by providing training and education on the causes of fatal and other serious accidents to industries and labor.

## E. ACCIDENT CAUSATION

Prior to the implementation of measures to prevent accidents, decision-makers must understand why they occurred. The most common theme across theories of accident causation was summarized by Hammer (1972):

> Man as a hazard...almost every mishap can be traced ultimately to personnel error, although it may not have been error on the part of the person immediately involved in the mishap. It may have been committed by the designer, production worker, maintenance man, or almost anyone other than the person present when the accident occurred. (p. 68)

Goetsch (1996) lists the most common theories of accident causation as: (1) Domino Theory; (2) Human Factors Theory; (3) Accident/Incident Theory; (4) Epidemiological Theory; and (5) Systems Theory.

### 1. Domino Theory

Heinrich et al. (1980) developed one of the earliest and most common theories of accident causation. An accident can be viewed as such a sequence with five factors or "dominoes" reacting with the end result being an injury. These five factors are: (1) ancestry and social environment; (2) fault of person; (3) unsafe act and/or mechanical or physical hazard; (4) accident; and (5) injury. The two central points that are key to this theory are; (1) injuries are caused by the action of preceding factors; and (2) removal of the central factor (unsafe act/hazardous condition) negates the action of the preceding factors and thereby prevents accidents and injuries (Goetsch, 1996).

### 2. Human Factors Theory

Human factors models of accident causation focus on a chain of events leading to an accident with the root cause lying in some form of human error. Popular human factors theories include Adjustment Stress and the Ferrell theory. Adjustment Stress theory attributes stress factors, both internal and external to the workplace, to the causation of accidents. These factors may include excessive working space temperatures or physical requirements in the work area, an alcohol or drug addiction, or a realm of other stresses negatively contributing to a workers performance. The primary concept is an abundance of these stresses overloads the worker and leads to an accident (Heinrich, Peterson & Roos, 1980). Ferrell developed his theory, which states that accidents are the result of a causal chain, with one or more of the causes being human error. This human error is caused by one of three situations as summarized by Heinrich et al. (1980):

1. overload which is the mismatch of a human's capacity and the load to which he is subjected in a motivational and arousal state
2. incorrect response by the person in the situation which is due to a basic incompatibility to which he is subjected
3. an improper activity that he performs either because he didn't know any better or because he deliberately took a risk. (p. 46)

Clearly roots of human error found in accidents can be the result of an individuals actions or inactions.

### 3. Accident/Incident Theory

Peterson (1975), adopting concepts from Ferrell, developed the accident-incident theory of accident causation. This model states that there are two causes for accidents: human error and/or systems failure. Accident causes can come from either or both (Heinrich, Peterson & Roos, 1980). Human error is classified into three broad categories: (1) overload; (2) ergonomic traps; and (3) decision to err. The concepts of overload and ergonomic traps follow Ferrell's model closely, however, Peterson introduces two new concepts of systems failure and decision to err. The systems failure component explains an organizations managerial contribution to safety practices, such as policy/standards and training and corrective measures. Decision to err is a form of human error which may be conscious and based on logic or simply unconscious (Goetsch, 1996).

### 4. Epidemiological Theory

Epidemiology is the study of the factors controlling the presence or absence of a disease or pathogen (Woolf, 1980). In the study of accident causation, these factors are viewed as environmental factors in the workplace, which contribute to the occurrence of an accident. Epidemiological theory uses models to study the causal relationships between these environmental factors and accidents (Colling, 1990). The key components of this theory are predisposition characteristics and situational characteristics. The combination of these components may result in or prevent an accident (Goetsch, 1996). Suchman (1961) proposed epidemiology model states that predisposition characteristics (susceptible hosts such as people or a hazardous environment) interacting with situational characteristics (risk-taking or peer pressure) results in accident conditions (the unexpected, unavoidable, or unintentional) producing accident effects (injury or damage).

**5. Systems Theory**

A system is a group of interrelated, interacting, or interdependent components that together form a complex whole (Woolf, 1980). The systems theory of accident causation views these components as people, machinery, and the environment, which interact together to form a system capable of producing an accident (Firenzie, 1971). How these components interact increases or decreases the probability of an accident event occurring. Firenzie (1978) developed the most popular systems theory model whose primary components are the person/machine/environment, information, decisions, risks, and the task to be performed. The premise of this model is that a person must interact with a machine or tool in the environment when performing a task. Prior to performing the task, the person must collect information, weigh risks, and decide whether or not to perform the task. Firenzie (1978) asserts that factors which must be considered when collecting information, weighing risks, and making decisions include: (1) job requirements; (2) the workers abilities and limitations; (3) what is gained if the task is successfully accomplished; (4) what is lost if the task is attempted but fails; and (5) what is lost if the task is not attempted. These factors enhance the decision making process of a worker and allow for a more favorable interaction of system components within a working environment. This favorable interaction reduces the probability of accident occurrence.

The theories of accident causation previously discussed develop models to explain the occurrence of accidents. When comparing theory with reality, often an accident situation may not fit a particular model of accident causation. The accident cause may combine parts of several different models. The combination theory of accident causation explain accidents which occur as a result of a combination of several different causal factors (Goetsch, 1996).

## F. ACCIDENT INVESTIGATION

Accident investigation serves as the primary tool for the identification of causes contributing to an accident. Once these causes are identified, corrective measures can be taken to preclude similar accidents from occurring in the future. The quality of the accident investigation process and the information obtained from it will determine the success of corrective measures (Hill, Byers, Rothblum, & Booth, 1994). Therefore, it is imperative that accident investigators are properly trained in accident investigation procedures (Raby & McCallum, 1997).

Personnel conducting accident investigations range from untrained persons with limited resources working alone to large investigative teams of experts with unlimited resources (Ferry, 1988). Typically, accident investigations are conducted by personnel with very little training or background in investigative procedures (Ferry, 1985). For example, when personnel injuries occur at U.S. Navy units, investigative procedures are required to produce the proper reports. These personnel injuries may range from a work-related injury on-duty to a motorcycle accident off-duty. Normally, the investigation and reporting requirements are randomly assigned to an available officer stationed at the unit who typically possesses no training in investigative procedures (CDR Rowe, personal communication, May 20, 1998).

Accident investigators tend to have preconceived notions and perceptions which cloud their judgment when performing an accident investigation (Benner, 1982). The goal of any accident investigative procedure is to collect as much factual information as possible pertaining to the occurrence of the accident. Preconceived notions and perceptions by the investigator can lead to a fault-finding investigation focusing on placing blame or identifying a "scape goat". In turn, witnesses may be less inclined to reveal critical information pertaining to the actual causes of an accident (McElroy, 1974; Goetsch, 1996).

Regardless of the reason for an investigation, investigators must ask the questions: what happened, why did it happen, when did it happen, where did it happen, how did it happen, and who was involved? (Benner, 1975). This unbiased fact finding approach allows for the identification and collection of accident causes, the primary focus of an accident investigation. NSC (1991) provides the best overview of this philosophy and technique:

> As you investigate, don't put the emphasis on identifying who could be blamed for the accident. This approach can damage your credibility and generally reduce the amount and accuracy of information you receive from workers. This does not mean you ignore oversights or mistakes on the part of employees nor does it mean that personal responsibility should not be determined when appropriate. It means that the investigation should be concerned with only the facts. In order to do a quality job of investigating accidents you must be objective and analytical. (p. 69)

Investigators must remain open-minded and objective during the investigation. They must be viewed by workers as a separate entity from any punitive or administrative board involved in the investigation (McElroy, 1974). This approach creates a perception of fairness by the workers and lead investigators to the key facts surrounding the accident scenario.

A human factors contribution to an accident consists of an individuals decisions, actions, or inactions directly linked to the series of events leading to the accident (Raby & McCallum, 1997). Estimations of accident causes attributable to human factors average 75 percent and in some cases as high as 90 percent (Perrow, 1984; Reason, 1990). For this reason, Mayer and Ellingstad (1992) assert that a human factors analysis must be conducted in conjunction with the fact-finding basis of an accident investigation. With a trend of accident investigators, who typically possess little knowledge or training in accident investigation, lies the inherent and compounding problem of investigators with literally no experience in human factors analysis. This confound may lead investigators to targeting an easy human cause factor (e.g. operator error) rather than probing below the surface for the underlying cause such as inadequate equipment design (Hill, Byers, Rothblum, & Booth, 1994). Clearly, an in-depth human factors analysis during accident investigations is a key in understanding how and why accidents occur. Once the how and why are identified, accident prevention strategies can be employed to prevent future accidents, which is the main objective of accident investigations.

## G. ACCIDENT REPORTING

Accident investigative procedures must culminate in a comprehensive, unbiased, factual based accident report (Goetsch, 1996). The goal of the accident report is to provide safety professionals and engineers with the information necessary to identify root accident causal factors. Once these factors are identified, accident prevention strategies can be implemented to prevent future accident occurrence.

Safety professionals are faced with two primary tasks when producing accident reports. They must produce reports required by federal and state laws and provide reports useful to an effective safety program. Often these two requirements create a conflict of interest (NSC, 1975). Studies indicate accident-reporting systems are not producing factual information databases, but have grown into a relatively unplanned way to meet individual or organizational needs and preferences (Adams & Hartwell, 1977). Organizations must elicit unbiased databases conducive to the development of accident prevention strategies.

A difficult dilemma facing safety professionals is how long and detailed should an accident report be? On one hand an accident report must be quick and simple to prevent unnecessary work by those completing the forms. In contrast, the form must be detailed and long enough to provide all necessary facts surrounding the accident to be useful for formulating accident prevention strategies (Pimble & O'Toole, 1982).

Accident reports can take many forms, such as a checklist, questionnaire, or a narrative summary. Every organization presents a unique atmosphere of accident problems, therefore no single standard accident report form may solve the safety problems of each organization (NSC, 1975). Organizations must adopt a report format conducive to their work atmosphere. A common theme in the literature is that the forms being used by investigators are not capturing the ergonomics or human factors aspects of an accident event (Adams, Barlow, & Hiddlestone, 1981). Considering human factors present in accident events has been estimated as high as 90 percent (Perrow, 1984), investigators must ensure these factors are captured in the accident report format.

In order to capture human factors aspects of an accident event, the accident form must be geared at determining the causes rather than describing the effects. Adams et al. (1981) and Edwards (1981) suggest that to accomplish this goal accident report forms should meet the criteria of a good questionnaire design since the writing skills of investigators may vary. In addition, Adams et al. (1981) suggests this questionnaire should produce information already categorized. In doing so "data which are categorical can be translated into meaningful statistical tables much more readily than can qualitative, descriptive data" and "if this categorization of data is carried out at the initial report stage, the intrusion of misinterpretation, ambiguity and consequent reduction of validity are all minimized" (p. 71). Clearly such an approach would produce unbiased, factual data useful for the analysis and design of accident prevention strategies, the main goal of an accident-reporting system.

## H. ACCIDENT ANALYSIS

Accident analysis techniques range from the simple tabulation of frequency or severity rates to a more sophisticated technique of task analysis, an in-depth analysis producing a step-by-step description of the work task performed. Regardless of the technique used, the goal of accident analysis is to identify specific causal factors of the accident so that corrective actions can be taken to preclude similar accidents from occurring (Drury & Brill, 1983). The major problem impeding this goal is that accident databases for analysis are generated by investigators outside the field of human factors, when in fact human factors have been found to be attributable to 90 percent of accidents

(Perrow, 1984; Shappell & Wiegmann, 1997b). As a result, few organizations generate corrective actions from the analysis of their accident database (Kletz, 1976).

Pimble and O'Toole (1982) cite a new Swedish system for collecting and analyzing occupational injuries. The system places much emphasis on accident prevention with the following goals: "(1) to initiate a local investigation of every accident; (2) to provide statistical services for individual companies, industrial inspectors, instructors, employers and employees organizations; and (3) to provide a report form suitable for both safety and insurance purposes" (p. 969). Investigating every accident is important since accidents, minor or major, provide valuable information for analysis. Reports and analysis suitable for both safety and insurance purposes is a formidable goal, since it accomplishes two objectives. Statistical services are a nice feature, however, as suggested by Blake (1963), reports and analysis are not useful if they just tell the story statistically. Analysis of accident reports must capture the "how" and "why" of an accident event.

Heinrich's domino theory of accident causation views an accident as a sequence of events. Drury and Brill (1983) observe that each job activity consists of a sequence of tasks and that accidents are the interaction between the individual, the task, the equipment, and the environment. Therefore, analyzing the human factors aspect of each task can identify the "how" and "why" of an accident sequence (Monteau, 1977). Drury and Brill (1983) assert that once these accident producing tasks are identified they can be grouped into hazard patterns or "scenarios", which are considered useful if:

1. A maximum of six scenarios accounts for more than 90 percent of the in-depth investigations.
2. Each scenario suggests at least one apparently feasible and effective intervention strategy appropriate only to that scenario.

3. Each scenario is mutually exclusive of all others, so that each in-depth investigation can be assigned logically to one and only one scenario.
4. Each scenario has human factors as a major parameter in its description (p. 335).

In summary, once these scenarios are identified, interventions can be aimed to reduce their occurrence.

Drury and Brill's (1983) concepts are successfully applied by Laughery, Petree, Schmidt, Schwartz, Walsh, and Imig (1983). Laughery et al. (1983) emphasize Blake's (1963) concept that analysis which tells the story statistically is of no use in capturing the "how" and "why" of an accident event. They assert statistical analyses, consisting of data tabulation, tend to be static and do not capture the dynamics of an accident event. Developing an accident scenario coding scheme consisting of four dynamic variables – prior activity, accident event, resulting event, and injury event – and two descriptor variables – agent of accident and source of injury – they code 1,874 industrial accidents. Once coded with this scheme, they are able to show that scenarios or patterns, consisting primarily of human factors, can be identified and interventions can be aimed at reducing their occurrence. In a similar analysis, Laughery and Schmidt (1984) use a similar scenario analysis coding scheme to analyze industrial back injuries. Their results indicate that 72 percent of the back injuries can be attributed to just one scenario – overexertion. Clearly, they suggest interventions can be focused on the design of the tasks and the limitations of the employees carrying them out.

## I. NAVY OCCUPATIONAL AND SAFETY HEALTH PROGRAM

OSHA is directed towards the private sector employer, however, provisions of the Act required federal agencies to establish and maintain occupational safety and health programs. Although the Navy has conducted occupational safety and health standards for many years, the Secretary of the Navy (SECNAV) issued policy statements and outlined responsibilities for the implementation of the total safety and occupational health program for the Navy (DON, 1997a). In addition to standard occupational safety and health, the total safety and occupational health program focuses on all safety disciplines, including system safety, aviation safety, weapons and explosives safety and off-duty safety (DON, 1997b). The primary document guiding the implementation of the program for all Navy commands, both shore and afloat, is OPNAVINST 5100.23C, "Navy Occupational Safety and Health (NAVOSH) Program Manual" (DON, 1997c). A tailored version of this manual for the operational fleet is OPNAVINST 5100.19C, "NAVOSH Program Manual for Forces Afloat" (DON, 1997a).

OPNAVINST 5100.19C provides guidance for the implementation of the NAVOSH program onboard all U.S. Navy surface ships and submarines, including U.S. Naval Ships (USNS) of the Military Sealift Command (MSC). This manual is broken down into four sections: (1) NAVOSH Program; (2) Major Hazard – Specific Programs; (3) Surface Ship Safety Standards; and (4) Submarine Safety Standards. In addition, the manual provides checklists for the self-evaluation of a unit's overall NAVOSH Program and major hazard-specific programs.

Section one, NAVOSH Program, provides an overview of the NAVOSH Program organization and delineates responsibilities from the Chief of Naval Operations (CNO) to Fleet Commanders on down to individual afloat units. They key is the requirement for every Navy unit to designate a safety officer responsible for the implementation and enforcement of the NAVOSH program. Guidelines are established for inspections and surveys conducted by an outside agency in order to evaluate an individual unit's compliance to NAVOSH standards. Mishap investigation and reporting procedures are provided to capture the dynamics of an accident event for collection, analysis, and dissemination by NAVSAFECEN. In addition, training requirements are set forth since the basis of any safety program is continuous, effective all hands training and participation.

Section two, Major Hazard – Specific Programs, addresses specific hazards such as hearing conservation, heat stress, respiratory protection, electrical safety, and hazardous material control as well as personnel protective equipment (PPE). The intent is similar to OSHA standards, certain hazard areas present a greater risk to personnel and, therefore, more specific safety guidelines can assist supervisors and personnel in preventing accidents in these areas. The guidance here provides key shipboard personnel, such as the Safety Officer, Electrical Safety Officer, Hazardous Material Coordinator, and Medical Department representatives, with the information necessary to manage and implement effective occupational safety and health standards in their specific hazard area.

Sections three and four, Surface Ship Safety Standards and Submarine Safety Standards respectively, provide safety guidelines specific to their individual environments. Though two distinct and unique environments, a common theme is found in both as described by the DON (1997a):

> Shipboard life is one of the more hazardous working and living environments that exist. The existence of hazardous materials and equipment, in addition to the fact that a ship is a constantly moving platform subject to conditions such as weather, collision, and grounding contribute to an accident prone environment. Any chain of mishaps could lead to a major catastrophe. It is for this reason, PRACTICAL SAFETY must be followed and the prescribed safety regulations strictly followed to prevent personal injury and illness. (p. C1-1, p. D1-1)

Clearly, the working environment onboard surface ships and submarines provides additional factors private sector employers do not face, such as weather conditions and a lack of outside activity support when at sea. What may be considered a minor mishap in the private sector can lead to the complete loss of a shipboard vessel and her crew. For this reason, specific safety guidelines are provided for the safe and effective operation of naval ships and submarines.

## J. ELECTRICAL HAZARDS AND SAFETY

Chapter 300 of the Naval Ships' Technical Manual concerning general electrical plant safety precautions states:

> ELECTRIC SHOCK. Safety precautions must always be observed by persons working around energized electric circuits and equipment. Injury may result from electric shock. Short circuits can be caused by accidentally placing or dropping a metal tool, flashlight case, or other conducting article across an energized line. These short circuits can cause an arc or fire on even relatively low voltage circuits, and may result in extensive damage to equipment and serious injury to personnel. (Naval Sea Systems Command, 1997, p. 2-1)

An electrical shock injury is caused by the flow of electrical current through the body. Current flow is measured in amperes (amps) and the severity of an electrical shock injury is reflective of the amount of current flow: (1) 0.001 amps and a shock is felt; (2) 0.01 amps and a person may be unable to let go; (3) 0.1 amps and a shock may be fatal if it lasts for one second or more (DON, 1996). Understanding the hazards of electrical current is the key to preventing personnel injury.

Goetsch (1996) provides an excellent description of current flow. For current to flow, the path of electrical current must make a complete loop. Elements of this loop include the source of electrical power, a conductor (conducive to electrical flow) to act as the path, an electrical device to use the current, and a path to the ground. When an individual makes contact with a conductor carrying a current and contacts the ground or another object that provides a conducive path to the ground, electrical shock can occur. The individual completes the circuit loop and the current passes through his or her body.

The key to understanding the effects of current flow is Ohm's law: V=IR. V is the potential difference in volts, I is the current flow in amps and R is the resistance to current flow in ohms. Typical electrical systems are 110 volts. Human resistance to electrical current is normally 100,000 ohms for dry skin, 1,000 ohms for wet skin, 400 to 600 ohms for the internal body (hand to foot), and about 100 ohms from ear to ear (McElroy, 1974). Using Ohm's law and performing the math indicates the human body is an excellent conductor of electricity (e.g. V=110 volts and R=600 ohms due to hand contact with an electrical current, I=V/R and the individual is exposed to 0.183 amps, more than enough to cause fatal injury). Therefore, the higher the resistance, the lower the current flow, and the probability of electrical shock is reduced. Thus electrical shock injuries can be prevented by insulating the conductors (insulators such as rubber gloves are not conducive to current flow), insulating the people, or isolating the electrical equipment from the people (Goetsch, 1996).

Despite the fatal hazards associated with electrical current, electrical injuries continue to occur in the work environment. Common causes of electrical shock include contact with a bare wire carrying current, working on electrical equipment in which the power is not secured, working on electrical equipment in a damp or wet environment, working on electrical equipment without PPE, or working on electrical equipment that has not been properly grounded. Electrical systems onboard a naval vessel tend to create more of a hazard to personnel since these systems are ungrounded as compared to grounded systems in an industrial environment ashore (Naval Sea Systems Command, 1997).

In simple terms, a grounded system provides a conducting path between the equipment and the earth, providing less of a hazard to personnel. Personnel onboard ship do not have this luxury since the electrical systems onboard ship are ungrounded systems. When an individual comes in contact with a live conductor of an electrical system onboard ship it has the capacitance to ground to the ships hull. The individual provides the missing link of the loop for current flow and the current flows through the individual to the hull resulting in an electrical shock (DON, 1996).

The attributes of a shipboard environment create significant electrical hazards. Practically every piece of equipment onboard ship requires electrical power, such as radars to navigate, weapons systems for defense, communication gear, portable tools, personal equipment, and lighting. The combination of high humidity, metal structures, high voltage electricity, perspiration, and seawater enhance typical electrical hazards found ashore. For these reasons, the Navy considers electrical safety an all hands responsibility (DON, 1997a).

All U.S. Navy ships and submarines maintain an electrical safety program in accordance with U.S. Navy regulations. This program includes semi-annual electrical training required for all personnel, a portable tool issue room, control and safety testing of all personal electrical and electronic equipment, specific electrical equipment tag-out procedures, and PPE. In addition, the electrical safety program contains a checklist of requirements for continued self-evaluation and inspections. Due to the uniqueness of a shipboard environment, 100 percent compliance by all personnel is mandatory to prevent fatal electrical hazards (DON, 1997a).

## K. SUMMARY

Prior to the 20th century, practically no legislation existed promoting safety and health for employees. The 20th century saw the birth of the Safety Movement and the single most important piece of legislation promoting safety and health, the OSHA Act. Employers, including the U.S. Navy, faced with moral, legal, and economical obligations, have undertaken safety programs to prevent accidents. In an attempt to prevent accidents the root causes must be identified. With this in mind numerous theories of accident causation have been formed and they primarily center on the human element.

Estimates of human causal factors attributable to accidents have ranged as high as 90 percent. Accident investigating, reporting, and analysis techniques indicate accident databases are not conducive to human factors analysis. Recent studies investigating and analyzing accidents through task and scenario analysis indicate root human causal factors of accident occurrence can be identified. Once identified, interventions aimed at these hazard patterns or scenarios can lead to effective accident prevention programs.

Of particular interest in this study are electrical hazards and safety in a shipboard environment. Understanding the hazards associated with electrical equipment is the key to preventing personnel injury. Human factors related interventions such as tagout of equipment and PPE assist in preventing electrically related mishaps to personnel. Identifying failed interventions and maintaining a quality electrical safety training and awareness program is the key to preventing fatal electrical injuries to personnel in a shipboard environment.

# III. METHODOLOGY

## A. RESEARCH APPROACH

This study is based on the existing database of SCM Reports maintained by NAVSAFECEN. The SCM Reports selected contain data relating to electrical shock occurrence onboard surface ships. A human factors analysis is conducted to identify salient patterns present in the data that might be used to predict the estimated number of future electrical shock mishaps. A stochastic model of electrical shock mishap occurrence is constructed, potential intervention strategies are identified for the human factors components found, and are evaluated using the model. In particular, the stochastic model is used to evaluate estimated future mishap frequencies and associated costs.

## B. DATABASE

NAVSAFECEN maintains a database of all reported occupational and operational mishaps occurring to Navy and Marine Corps personnel. Each electrical shock SCM Report received by NAVSAFECEN is entered by hand into the Safety Information Management System (SIMS) database. The SIMS database is queried for all incidents of electrical shock occurring onboard U.S. Navy surface ships to both active duty, TAR, and reservist personnel in the U.S. Navy and U.S. Marine Corps between 1 January 1995 and 31 December 1997. A total of 897 reports involving 927 cases of electrical shock are obtained.

## C. SPECIAL CASE MISHAP (SCM) REPORTS

SCM Reports are submitted to NAVSAFECEN by the mishap unit via message traffic or a written report in accordance with OPNAVINST 5100.19C (DON, 1997a).

They contain a brief narrative of the mishap, demographic information of the mishap victim and mishap unit, and identifiable contributing mishap cause factors. There is a wide range in the quality of inputs provided by the mishap units. Appendix A provides an example of a SCM.

## D. PROCEDURE

On-line queries of NAVSAFECEN's database containing SCM Reports for electrical shock incidents are provided in ASCII text format. The ASCII text is converted to Microsoft Word 97 format and all unnecessary headers and repetitive fields are deleted in order to condense the reports. Electrical shock mishap data is extracted from the condensed SCM Reports and entered into a Microsoft Excel 97 spreadsheet. The spreadsheet consists of rows of electrical shock mishaps and columns of descriptive statistics and categorical data. Electrical shock mishaps involving more than one person are classified as a single mishap, however one row is used for each person injured in the mishap. The columns consisted of the date and time of occurrence, mishap classification, ship type, ship status (inport/underway), evolution ship involved in, fleet ship assigned, age, sex, rating or rank, task performing, and task experience of the victim, cost of the injury, victim's work days lost, days hospitalized, and restricted activity work days, general cause factor, and a brief summary of the event.

## E. DATA ANALYSIS

Electrical shock mishaps are classified using an abridged form of scenario analysis, and salient human factors patterns are identified through data tabulation. Data is fit to a stochastic model to identify the electrical shock mishap arrival process. In particular, a Poisson process model is used since it has proved successful in previous studies (e.g. Schmorrow, 1998). The model includes both mishaps that involve human factors and those that do not involve human factors. A Compound Poisson process is used to estimate the number of personnel shocked when a mishap event occurs, in addition to the costs associated with the event. Potential intervention strategies are identified from failed human factors interventions and subsequently evaluated using the electrical shock mishap model developed to determine their potential impact on future mishap frequencies and associated costs.

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# IV. RESULTS

## A. BACKGROUND

The average number of electrical shock mishaps occurring onboard U.S. Navy surface ships exhibits a general increase from CY90 - CY97. Figure 1 depicts the average number of electrical shock mishaps per surface ship for CY90 through CY97 and Figure 2 depicts the average number per 1,000 personnel assigned to those ships. The average number of electrical shock mishaps per surface ship averages 0.92 for CY90 – CY94 and 1.17 for CY95 - CY97, whereas the average number per 1,000 personnel assigned to those ships averages 2.10 for CY90 - CY94 and 2.65 for CY95 – CY97.

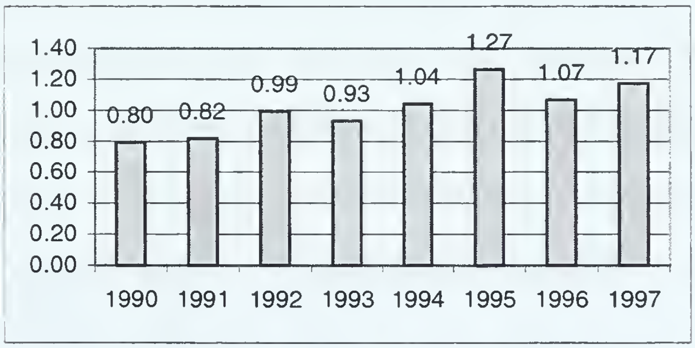


**Figure 1. Average Number of Electrical Shock Mishaps per Surface Ship by Year**

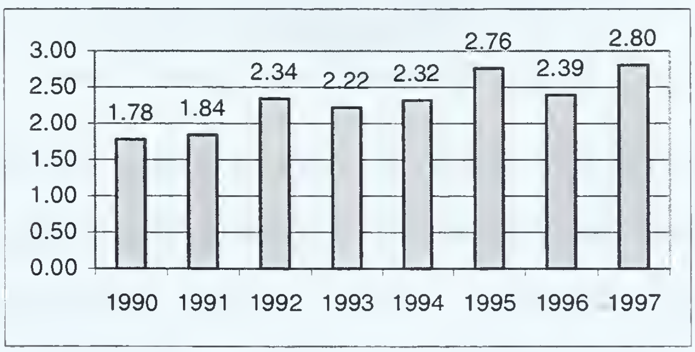


**Figure 2. Average Number of Electrical Shock Mishaps per 1,000 Personnel by Year**

Prior to 1995 major draw-downs and budget constraints result in a significant decrease in the number of surface ships and the personnel assigned to those ships each year. In January 1994 there are 292 surface ships and 128,097 personnel assigned to those ships and by December 1994 there are 265 surface ships and 120,975 personnel, a decrease of 27 ships and 7,122 personnel in just one year. Over a three year period, from January 1995 until December 1997, the number of surface ships and personnel decreases by only 3 ships and 16,395 personnel. With an increasing trend in electrical shock mishaps and a relatively stable force structure, CY95 - CY97 represents a robust data set for root cause identification of electrical shock occurrence.

## B. DATA EXPLORATION

Between 1 January 1995 and 31 December 1997 there are a total of 897 reported electrical shock mishap events resulting in 927 personnel receiving an electrical shock. Clearly, the majority of the events involve a single individual receiving an electrical shock (92.32%), however some events result in as many as four individuals receiving a shock. The total number of events and shocks are summarized in Table 1.

| # Personnel | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| 1 | 311 | 272 | 290 | 873 | 97.32% |
| 2 | 8 | 6 | 6 | 20 | 2.23% |
| 3 | 1 | 0 | 1 | 2 | 0.22% |
| 4 | 1 | 0 | 1 | 2 | 0.22% |
| Total Events | 321 | 278 | 298 | 897 | 100.00% |
| Total Shocks | 334 | 284 | 309 | 927 | |

**Table 1. Electrical Shock Mishap Events**

The Navy classifies mishaps according to accident severity depending on the dollar value reached and/or involvement of personnel fatalities/injuries (see definitions page 6). Mishap severity includes: 1 Class A (0.11%), 3 Class B (0.32%), 61 Class C (6.58%), and 862 Class D (92.99%). It should be noted the only Class A electrical shock mishap involves a fatality. In addition, most of the mishaps are less than Class C in severity. Table 2 provides a summary of mishap severity.

| Severity | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Class A | 1 | 0 | 0 | 1 | 0.11% |
| Class B | 0 | 0 | 3 | 3 | 0.32% |
| Class C | 29 | 20 | 12 | 61 | 6.58% |
| Class D | 304 | 264 | 294 | 862 | 92.99% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 2. Electrical Shock Mishap Severity**

Ship type can be divided into five categories: Carriers, Combatants, Amphibs, Auxiliaries, and Other. Out of the 927 electrical shock mishaps, "Carriers" account for 299 (32%) of the mishaps. "Combatants" (cruisers, destroyers, and frigates) account for 297 (32%) of the mishaps. The remaining distribution of mishap ships are as follows: 155 (17%) on "Amphibs" (helicopter, equipment, and troop transport ships), 133 (14%) on "Auxiliaries" (oilers, ammunition ships, and repair ships), and 43 (5%) on "Other" (patrol craft, mine counter-measure, diving ships, and unknowns). Carriers, with the largest crew of any naval vessel, account for a majority of the mishaps. A classification of the electrical shock mishap data by ship type is provided in Figure 3.

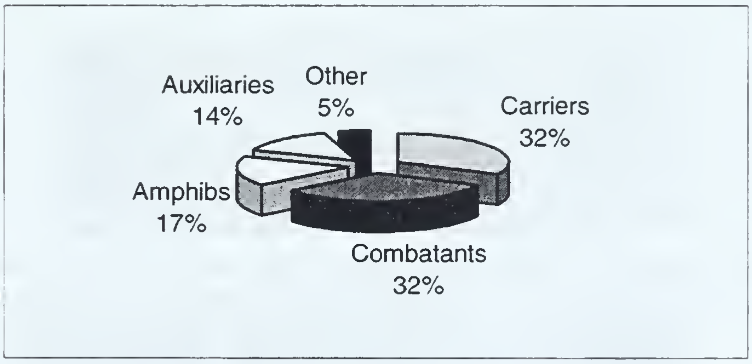


**Figure 3. Electrical Shock Mishaps by Ship Type**

Data extracted specific to a "mishap ship" includes the fleet to which the ship is assigned, the location of the ship at the time of the mishap, and the evolution the ship is involved in when the mishap occurred. Out of the 927 electrical shock mishaps, Commander In Chief, U.S. Atlantic Fleet (CINCLANTFLT) is responsible for 523

(56.42%) of the mishap ships and Commander In Chief, U.S. Pacific Fleet (CINCPACFLT) is responsible for the remaining 404 (43.58%). When the mishaps occur, 401 (43.26%) are underway (at sea), 387 (41.75%) are inport, 121 (13.05%) are in a shipyard, and the remaining 18 (1.94%) are at anchor or in a dry-dock. Evolutions of the mishap ships include 417 (44.98%) involved in upkeep (maintenance), 350 (37.76%) involved in independent steaming operations, 99 (10.68%) conducting an overhaul in the shipyards, 43 (4.64%) conducting flight operations, and the remaining 18 (1.94%) are involved in other evolutions (underway replenishment operations, sea and anchor detail, or conversion prior to commissioning). The Atlantic Fleet accounts for slightly more of the mishaps, there is an insignificant difference between a mishap occurring underway or inport, and a majority of the mishaps occur during upkeep or independent steaming operations. A tabulation of the fleet to which a ship is assigned, the location of the ship at the time of the mishap, and the evolution the ship is involved in when the mishap occurred is provided in Tables 3, 4, and 5.

| Fleet | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Atlantic | 188 | 156 | 179 | 523 | 56.42% |
| Pacific | 146 | 128 | 130 | 404 | 43.58% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 3. Electrical Shock Mishaps by Fleet**

| Location | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Underway | 137 | 119 | 145 | 401 | 43.26% |
| Inport | 150 | 118 | 119 | 387 | 41.75% |
| Yards | 44 | 37 | 40 | 121 | 13.05% |
| Anchor/Dry-dock | 3 | 10 | 5 | 18 | 1.94% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 4. Electrical Shock Mishap Ship Locations**

| Evolution | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Upkeep | 159 | 132 | 126 | 417 | 44.98% |
| ISE | 125 | 99 | 126 | 350 | 37.76% |
| Overhaul | 36 | 32 | 31 | 99 | 10.68% |
| Flight Ops | 8 | 18 | 17 | 43 | 4.64% |
| Other | 6 | 3 | 9 | 18 | 1.94% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 5. Electrical Shock Mishap Ship Evolutions**

Table 6 provides a tabulation of an electrical shock mishap victim's service and duty status: active duty, TAR, and reservist personnel in both the Navy and Marine Corps. Active duty Navy personnel account for 911 (98.27%) of the mishaps; the remaining 16 (1.73%) are composed of Navy TAR, Navy reservist, and active duty Marine Corps personnel. Since the majority of a ship's crew is active duty Navy personnel, they account for most of the mishaps. Similarly, prior to 1997, few females were assigned to surface combatants. Thus, as seen in Table 7, males account for 874 (94.28%) of the victims, whereas females only account for the remaining 53 (5.72%). Table 7 provides a tabulation of mishap victims by gender.

| Service/Status | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Navy Active | 327 | 279 | 305 | 911 | 98.27% |
| Navy TAR | 6 | 2 | 2 | 10 | 1.08% |
| Navy Reserve | 0 | 0 | 1 | 1 | 0.11% |
| Marine Active | 1 | 3 | 1 | 5 | 0.54% |
| Total Shocks | 334 | 284 | 309 | 927 | 100.00% |

**Table 6. Electrical Shock Mishap Victims by Service and Status**

| Gender | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Male | 312 | 269 | 293 | 874 | 94.28% |
| Female | 22 | 15 | 16 | 53 | 5.72% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 7. Electrical Shock Mishap Victims by Gender**

A tabulation of mishap victims by rate and rank is given in Table 8 and depicted in Figure 4. E3's through E5's, who conduct a majority of the maintenance onboard surface ships, account for most of the mishaps (76.27%). Note the distinctive pattern amongst the E1's through E7's, who account for 96 percent of the mishap victims. With the exception of E8's through O5's, the data appears symmetrically distributed amongst E1's through E7's with a mode at E4's. The average age of an electrical shock mishap victim is 24 years old, roughly the average age of an E4 in the Navy.

| Rate/Rank | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| E1 | 5 | 10 | 6 | 21 | 2.27% |
| E2 | 26 | 21 | 25 | 72 | 7.77% |
| E3 | 73 | 63 | 62 | 198 | 21.36% |
| E4 | 114 | 104 | 102 | 320 | 34.52% |
| E5 | 72 | 53 | 64 | 189 | 20.39% |
| E6 | 25 | 21 | 26 | 72 | 7.77% |
| E7 | 9 | 4 | 6 | 19 | 2.05% |
| E8-O5 | 10 | 8 | 18 | 36 | 3.88% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 8. Electrical Shock Mishap Victims by Rate/Rank**

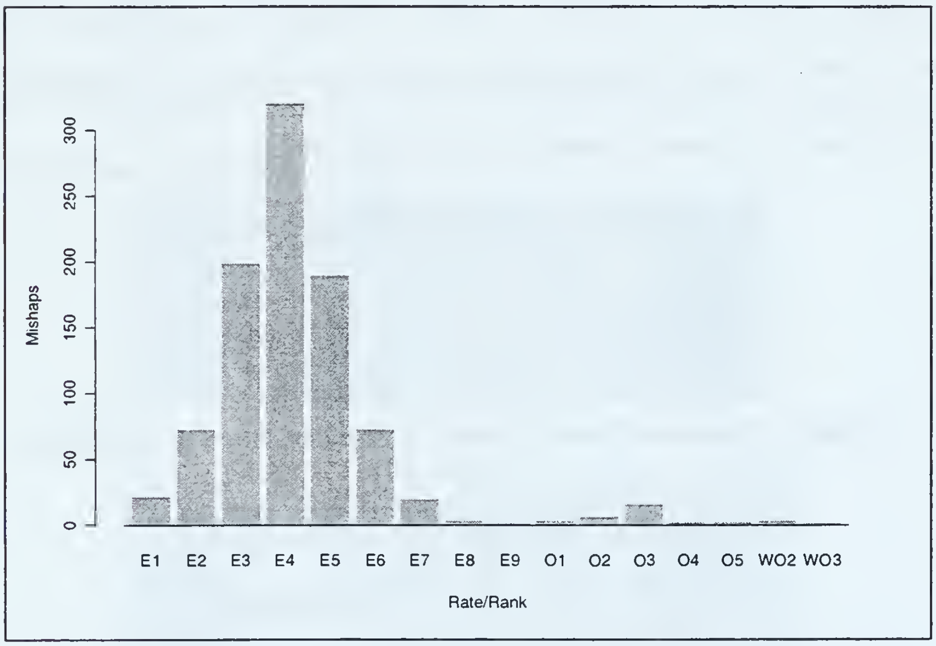


**Figure 4. Histogram of Electrical Shock Mishap Victims by Rate/Rank**

Table 9 provides a tabulation of electrical shock mishap victims by rating and rank. Electrical shock mishaps involve 58 different Navy enlisted ratings and 14 of those ratings account for 564 (60.84%) of the mishaps (EM, AT, MM, ET, MS, HT, BM, EN, IC, OS, FC, RM, DC, and AE). The remaining 44 Navy enlisted ratings account for 208 (22.44%), undesignated enlisted Navy personnel (Seaman, Fireman, and Airman) account for 118 (12.73%), Navy officers account for 32 (3.45%), and Marine enlisted personnel account for the remaining 5 (0.54%) of the mishaps. The Navy's "electrical ratings", EM, AT, and ET are 3 of the top 4 ratings involved in the mishaps.

| Rating | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Electrician's Mate (EM) | 31 | 26 | 27 | 84 | 9.06% |
| Aviation Electronics Technician (AT) | 24 | 19 | 23 | 66 | 7.12% |
| Machinist's Mate (MM) | 14 | 20 | 22 | 56 | 6.04% |
| Electronic's Technician (ET) | 26 | 13 | 15 | 54 | 5.83% |
| Mess Management Specialist (MS) | 15 | 13 | 19 | 47 | 5.07% |
| Hull Maintenance Technician (HT) | 9 | 14 | 17 | 40 | 4.31% |
| Boatswain's Mate (BM) | 14 | 12 | 10 | 36 | 3.88% |
| Engineman (EN) | 16 | 6 | 13 | 35 | 3.78% |
| Interior Communications Electrician (IC) | 15 | 9 | 5 | 29 | 3.13% |
| Operations Specialist (OS) | 11 | 12 | 6 | 29 | 3.13% |
| Fire Controlman (FC) | 11 | 7 | 6 | 24 | 2.59% |
| Radioman (RM) | 5 | 5 | 13 | 23 | 2.48% |
| Damage Controlman (DC) | 4 | 7 | 10 | 21 | 2.27% |
| Aviation Electronics Mate (Ae) | 10 | 4 | 6 | 20 | 2.16% |
| Subtotal | | | | 564 | 60.84% |
| 44 Other Ratings | 70 | 68 | 70 | 208 | 22.44% |
| Seaman/Fireman/Airman | 50 | 40 | 28 | 118 | 12.73% |
| Navy Officer | 8 | 6 | 18 | 32 | 3.45% |
| Marine Enlisted | 1 | 3 | 1 | 5 | 0.54% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 9. Electrical Shock Mishap Victims by Rating/Rank**

In order to estimate personnel injury costs, total number of days hospitalized and lost and/or restricted work days are tabulated by year (Table 10). In addition, Table 10 gives the number of fatalities (FAT), permanent total disabilities (PTD), or permanent partial disabilities (PPD) occurring in each year. The tabulation of injury costs are as follows: 76 mishap victims (8.20%) involve enlisted personnel, which account for all total days hospitalized (53), all lost work days (147), and all days restricted in work activity (248). One enlisted mishap victim is a FAT and one enlisted victim involves a PPD. The remaining 849 mishap victims involve no lost time case injuries. (note: the DOD cost standard table is provided in Appendix C with a justification of cost estimation techniques used for this analysis)

| CY95$ | 1995 | 1996 | 1997 | Totals | Rate | Cost |
|---|---|---|---|---|---|---|
| Restricted Activity Days | 212 | 11 | 25 | 248 | $230 | $57,040 |
| Lost Work Days | 83 | 25 | 39 | 147 | $460 | $67,620 |
| Hospitalized Days | 44 | 4 | 5 | 53 | $571 | $30,263 |
| Permanent Partial Disability | 0 | 0 | 1 | 1 | $141,024 | $141,024 |
| Fatality | 1 | 0 | 0 | 1 | $153,286 | $153,286 |
| No Lost Time Case Injuries | 297 | 262 | 290 | 849 | $147 | $124,803 |
| Total Injury Cost | $309,009 | $54,828 | $210,199 | | | $574,036 |

**Table 10. Electrical Shock Mishap Victim Injury Severity and Costs**

## C. HUMAN FACTORS ANALYSIS

A human factors contribution to an accident is contended to consist of an individual's decisions, actions, or inactions which are linked to a chain of events that lead to it (Raby & McCallum, 1997). Of the 927 electrical shock mishaps in CY95 – CY97, 794 (85.65%) are human factors related. The remaining 133 (14.35%) mishaps are classified as being either a material, environmental, or of unknown cause. Clearly, the human element accounts for most of the events. Table 11 provides a summary of electrical shock mishap causal factors.

| Cause | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Human Factors | 282 | 248 | 264 | 794 | 85.65% |
| Material | 44 | 30 | 32 | 106 | 11.43% |
| Unknown | 7 | 6 | 11 | 24 | 2.59% |
| Environmental | 1 | 0 | 2 | 3 | 0.32% |
| Totals | 334 | 284 | 309 | 927 | 100.00% |

**Table 11. Electrical Shock Mishaps by Causal Factors**

Electrical shock mishap victims are primarily engaged in six prior activities before a mishap occurs. These six activities account for 831 (89.64%) of the mishaps. They are:

1. Maintenance (33.55%) – activity involving corrective maintenance
2. Watch (18.77%) – activity carried out in the performance of watchstanding duties
3. Troubleshooting (14.67%) – activity involving the investigation of apparent discrepancies
4. Housekeeping (9.82%) – activity involving cleaning or field day
5. "PMS" - Planned Maintenance System (8.85%) – activity involving scheduled preventive maintenance
6. Welding (3.99%) – activity involving the uniting of metallic parts by heating

Eight other activities (inspection, space rehabilitation, food preparation, damage control, training, sanding/grinding, dishwashing, and laundry services) account for the remaining 96 (10.36%) of the mishaps. The majority of activities involve personnel working on equipment which is supplied electrical power and have known associated electrical shock hazards. A mishap victim has an average of 31.22 months experience with the task he or she is performing. Table 12 provides a summary of the electrical shock mishap victim's prior activity.

| Prior Activity | Total | Percent | Prior Activity | Total | Percent |
|---|---|---|---|---|---|
| Maintenance | 311 | 33.55% | Space Rehabilitation | 20 | 2.16% |
| Watch | 174 | 18.77% | Food Preparation | 17 | 1.83% |
| Troubleshooting | 136 | 14.67% | Damage Control | 14 | 1.51% |
| Housekeeping | 91 | 9.82% | Training | 14 | 1.51% |
| PMS | 82 | 8.85% | Sanding/Grinding | 6 | 0.65% |
| Welding | 37 | 3.99% | Dishwashing | 4 | 0.43% |
| Inspection | 20 | 2.16% | Laundry Services | 1 | 0.11% |
| | | | Totals | 927 | 100.00% |

**Table 12. Electrical Shock Mishaps by Victim's Prior Activity**

The safety literature indicates two primary human factors orientated electrical shock hazard interventions are associated with equipment which is supplied electrical power, they are proper tagout of equipment and use of personal protective equipment

(PPE). Tagout of equipment and PPE are not mutually exclusive and therefore a mishap can be a combination of the two. Tagout of equipment, PPE, or a combination account for 343 (37.00%) of the 927 electrical shock mishaps. The tabulation of failed human factors orientated interventions of the 927 electrical shock mishaps is presented in Table 13.

| Intervention | 1995 | 1996 | 1997 | Totals | Percent |
|---|---|---|---|---|---|
| Tagout | 58 | 39 | 63 | 160 | 17.26% |
| PPE | 48 | 41 | 45 | 134 | 14.46% |
| Both | 19 | 5 | 25 | 49 | 5.29% |
| Totals | | | | 343 | 37.00% |

**Table 13. Failed Human Factors Electrical Shock Interventions**

Cross tabulating primary prior activity with failed human factors interventions depicts a pattern which shows how much electrical shock mishaps can be reduced for each activity had the victim properly tagged out equipment, worn PPE, or properly performed a combination of both. The prior activities of maintenance and troubleshooting involve a majority of the failed interventions. The cross tabulation of primary prior activity with failed human factors interventions is presented in Table 14.

| Prior Activity | # Activities | Tagout | PPE | Both | Total | Percent |
|---|---|---|---|---|---|---|
| Maintenance | 311 | 63 | 41 | 17 | 121 | 13.05% |
| Watch | 174 | 9 | 1 | 2 | 12 | 1.29% |
| Troubleshooting | 136 | 42 | 29 | 16 | 87 | 9.39% |
| Housekeeping | 91 | 14 | 8 | 2 | 24 | 2.59% |
| PMS | 82 | 20 | 14 | 8 | 42 | 4.53% |
| Welding | 37 | 0 | 30 | 0 | 30 | 3.24% |
| Other | 96 | 12 | 11 | 4 | 27 | 2.91% |
| Totals | 927 | | | | 343 | 37.00% |

**Table 14. Cross Tabulation of Prior Activity with Failed Interventions**

Of the 794 human factors related electrical shock mishaps, the remaining 451 are attributable to the victim's decisions, actions, and inactions (34.00%) or to other individual's decisions, actions, and inactions (14.70%). Victim's decisions, actions, and inactions consist primarily of inattentiveness, complacency, violations, and an array of procedural errors. They are presented in Table 15. Other individual's decisions, actions, and inactions consist of procedural errors, inattentiveness, complacency, violations, and a combination of design problems and a lack of PMS and equipment procedural instructions. They are presented in Table 16. The majority of these mishaps are the result of the mishap victim's inattentiveness, complacency, or commission of electrical safety violations.

| **Mishap Victim Decisions/Actions/Inactions** | **Total** | **Percent** |
|---|---|---|
| Inattentiveness/Complacency/Violations | 199 | 21.47% |
| Procedural errors | 22 | 2.37% |
| Failure to use shorting probe/discharge capacitors | 24 | 2.59% |
| Failure to safety check equipment/extension cords | 27 | 2.91% |
| Failure to ground test equipment/equipment | 13 | 1.40% |
| Investigating cause of shock/electrical discrepancy vice reporting | 11 | 1.19% |
| Plugging/Unplugging power on | 11 | 1.19% |
| Operating equipment not qualified for | 3 | 0.32% |
| Cutting electrical cable while sanding/grinding | 2 | 0.22% |
| Failure to use insulated tools | 3 | 0.32% |
| **Totals** | **315** | **33.98%** |

**Table 15. Mishap Victim Decisions, Actions, and Inactions**

| **Other Individual Decisions/Actions/Inactions** | **Total** | **Percent** |
|---|---|---|
| Improperly installed (includes not grounded) equipment/junction box | 33 | 3.56% |
| Inattentiveness/Complacency/Violations | 28 | 3.02% |
| Improperly routed/damaged welding cable/electrical cable | 22 | 2.37% |
| Inadequate design/PMS coverage/Procedural coverage | 22 | 2.37% |
| Improperly dead-ended electrical cable | 19 | 2.05% |
| Cutting electrical cable while sanding/grinding | 4 | 0.43% |
| Plugging/Unplugging power on | 3 | 0.32% |
| Improperly repaired equipment | 2 | 0.22% |
| Failure to safety check equipment | 2 | 0.22% |
| Failure to discharge capacitors | 1 | 0.11% |
| **Totals** | 136 | 14.67% |

**Table 16. Other Individual Decisions, Actions, and Inactions**

To summarize the general findings, analysis of the mishap reports identifies that human factors attributable to electrical shock mishaps can be categorized into five categories: tagout of equipment, PPE, a combination of both, mishap victim's decisions, actions, and inactions, and other individual's decisions, actions, and inactions. Non-human factors – material, environmental, unknown causes – attribute to the remaining mishaps. Table 17 provides a summary of human factors and non-human factors attributable to the 927 electrical shock mishaps.

| Causes | | | | | |
|---|---|---|---|---|---|
| **Human Factors** | **1995** | **1996** | **1997** | **Total** | **Percent** |
| **Tagout** | 58 | 39 | 63 | 160 | 17.26% |
| **PPE** | 48 | 41 | 45 | 134 | 14.46% |
| **Tagout/PPE** | 19 | 5 | 25 | 49 | 5.29% |
| **Victim's Decisions/Actions/Inactions** | 110 | 107 | 98 | 315 | 33.98% |
| **Other's Decisions/Actions/Inactions** | 47 | 56 | 33 | 136 | 14.67% |
| **Subtotal** | 282 | 248 | 264 | 794 | 85.65% |
| **Non-Human Factors** | **1995** | **1996** | **1997** | **Total** | **Percent** |
| **Material** | 44 | 30 | 32 | 106 | 11.43% |
| **Unknown** | 7 | 6 | 11 | 24 | 2.59% |
| **Environmental** | 1 | 0 | 2 | 3 | 0.32% |
| **Subtotal** | 52 | 36 | 45 | 133 | 14.35% |
| **Totals** | 334 | 284 | 309 | 927 | 100.00% |

**Table 17. Electrical Shock Mishaps by Human/Non-Human Factors**

## D. STOCHASTIC MODELING

Gaver (1996) stated:

> Models are not supposed to be perfect representations of the data sets to which they are fitted, but to represent the situation of concern well enough to be useful. (p.3).

Stochastic modeling is used to model the status quo of electrical shock mishap occurrence in order to predict the expected number of mishap events and associated costs in the near future. More importantly, the model will provide an estimate of the variability of these quantities over the next several years. The CY95 - CY96 data is used to formulate the initial model and the CY97 data is used for model verification. Appendix D provides a summary of overall electrical shock mishap events by month.

An approach that has proved successful in prior mishap studies (e.g. Schmorrow, 1998) is to model the number of electrical shock mishap events that occur monthly as a

Poisson Process with rate $\lambda$, where $\lambda$ is the expected number of mishap events per month. A consequence of this model is that the number of events each month are then independently identically distributed Poisson random variables with an expected value of $\lambda$. The 618 electrical shocks occurring in CY95 - CY96 were the result of 599 mishap events. A chi-square goodness of fit test is used to determine whether or not the monthly occurrences of electrical shock mishap events in CY95 - CY96 can be reasonably modeled by a Poisson distribution. At a five percent level of significance, there was not enough evidence to reject the null hypothesis that the electrical shock mishap model followed a Poisson distribution (the chi-square test statistic is 4.53 with 6 degrees of freedom giving a p-value of 0.61). Therefore, the Poisson process model is suitable for predicting the occurrence of electrical shock mishap events.

The Poisson process model is tested to determine if it adequately predicts new data using the CY97 data (see Appendix D) not used in the initial model. At a five percent level of significance, cross validation demonstrates that the Poisson process model is valid for predicting future electrical shock mishap events (the chi-square test statistic is 3.29 with 6 degrees of freedom giving a p-value of 0.77).

Further, it is modeled that each time an electrical shock mishap event occurs it can be classified as a human factors event with probability p or a non-human factors event with probability [1–p], independent of all other events. Under this model, the number of human factors related mishap events is a Poisson process with rate $\lambda p$ and the number of non-human factors related mishap events is also a Poisson process with rate $\lambda[1-p]$ (Ross, 1997). From the CY95 - CY96 data the estimated monthly mishap event rate is $\hat{\lambda}$ = 24.96 mishap events per month, with an estimated probability of a human factors related event $\hat{p}$ = 0.855 (initial cause of 512 out of 599 mishap events).

In addition, to check that the probabilities p (human factors related event) and [1-p] (non-human factors related event) remain constant for CY95 – CY96 and CY97, a 2x2 contingency table test is conducted. From the test, there is no evidence to indicate that the probability of a human factors related mishap event changes in CY97 (the chi-square test statistic is 0.009 with 1 degree of freedom giving a p-value of 0.92).

## E. FUTURE PREDICTIONS AND ASSOCIATED COSTS

Let N(t) be the number of mishap events occurring in [0,t], where t is measured in months. The expected number of electrical shock mishap events E[N(t)] is estimated by 24.96t using the Poisson process model from the previous section. In addition, the number of personnel receiving an electrical shock in [0,t], X(t), as a result of those events is modeled. Let $Y_i$ be the number of personnel receiving an electrical shock as a result of a mishap event i, where i = 1, 2, …, 599. Assuming $Y_1, Y_2, \ldots, Y_{599}$ are independent and identically distributed, $\{X(t), t \geq 0\}$ is a Compound Poisson process, where

$$X(t) \quad = \quad \sum_{i=1}^{N(t)} Y_i \,.$$

The expected value, variance, and standard deviation of X(t) are calculated as follows (Ross, 1997):

$$E\left[X(t)\right] \quad = \quad \lambda t E\left[Y_1\right]$$

$$Var\left[X(t)\right] \quad = \quad \lambda t E\left[Y_1^2\right]$$

$$StdDev \quad = \quad \sqrt{Var\left[X(t)\right]}\,.$$

Table 18 gives the estimated expected number of electrical shock mishap events and personnel shocks for t = 12, 24, 36, 48, and 60 months. Since 97 percent of the mishap events involve only one individual receiving an electrical shock the variance and standard deviation are negligible.

| Months (t) | Estimated Expected Mishap Events | Estimated Personnel Shocks |
|---|---|---|
| 12 | 299.52 | 309.10 |
| 24 | 599.04 | 618.21 |
| 36 | 898.56 | 927.31 |
| 48 | 1198.08 | 1236.42 |
| 60 | 1497.60 | 1545.52 |

**Table 18. Estimated Expected Number of Electrical Shock Mishap Events/Shocks**

Expected future costs associated with electrical shock mishap events can be estimated similarly. Let the total cost of personnel receiving an electrical shock in [0,t] be denoted by C(t). Let $Z_i$ be the cost of electrical shocks as a result of a mishap event i, where i = 1, 2, ..., 599. Assuming $Z_1, Z_2, \ldots, Z_{599}$ are independent and identically distributed, $\{C(t), t \geq 0\}$ is a Compound Poisson process, where

$$C(t) \quad = \quad \sum_{i=1}^{N(t)} Z_i \, .$$

As before, the expected value, variance, and standard deviation of C(t) are:

$$E[C(t)] \quad = \quad \lambda t E[Z_1]$$

$$Var[C(t)] \quad = \quad \lambda t E[Z_1^2]$$

$$StdDev \quad = \quad \sqrt{Var[C(t)]}$$

Initially calculations yielded an estimated expected cost of \$607.41 (CY95\$) per electrical shock mishap event with an estimated standard deviation of \$6,871.09 (CY95\$). The expected value and standard deviation do not give a complete picture of the distribution of costs. For example, of the 599 mishap events, 574 (95.83%) involved cost less than \$1,000 (CY95\$) and the remaining 25 (4.17%) events involved costs between \$1,000 and \$153,286 (CY95\$). Thus, to get a more complete picture, the distribution C(t) is simulated by developing a function in the statistical software package S-Plus® (1998). The function generates 1000 annual costs based on first generating the number of electrical shock mishap events occurring in a year, N(12) from a Poisson ($\lambda$ = 24.96) distribution. N(12) costs are then generated (one for each event occurring in the year) based on a simple random sample from the empirical distribution of costs from CY95 – CY96 cost data. An estimated expected annual cost of \$182,459 (CY95\$) with a standard deviation of \$118,539 (CY95\$) is generated. This average annual cost provides for reasonable future cost estimations based on historical data (note the actual cost of CY97 mishap events is \$210,199 (CY95\$)). The standard deviation can be attributed to events involving fatalities or disabilities. A histogram of the distribution of costs is presented in Figure 5. A copy of the computer program function can be found in Appendix D.

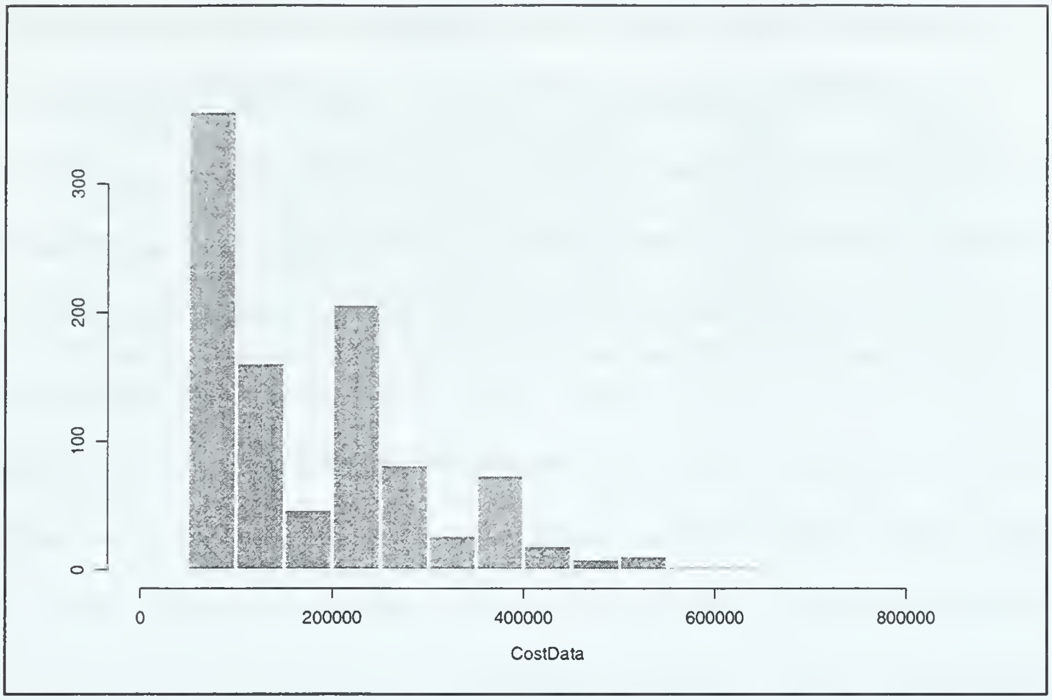


**Figure 5. Histogram of Yearly Electrical Shock Mishap Costs**

The expected costs of electrical shock mishap events are calculated for CY99 through CY03. The average annual cost for electrical shock mishap events of $182,459 is calculated in CY95 dollars. Future expected costs are converted to their applicable CY to adjust for inflation using cost estimation techniques justified in Appendix C. Figure 6 depicts the estimated future expected costs of electrical shock mishap events for CY99 through CY03 totaling over $1,000,000.

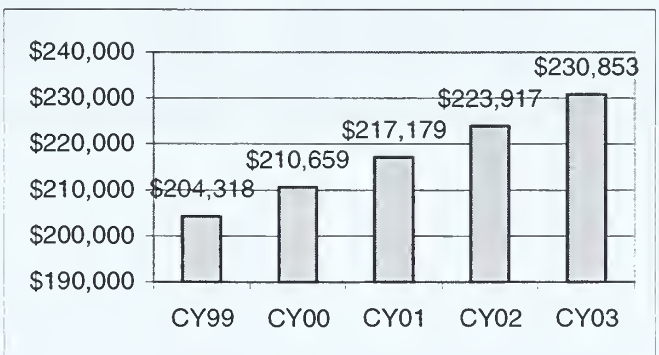


**Figure 6. Estimated Future Expected Costs of Electrical Shock Mishap Events**

## F. MISHAP EVENT REDUCTION AND COST SAVINGS ESTIMATES

The safety literature indicates two primary human factors orientated electrical shock hazard interventions are associated with equipment which is supplied electrical power, they are tagout of equipment and PPE. Tagout of equipment and PPE account for 343 (37.00%) of the 927 electrical shock mishaps (primary cause of 336 (37.45%) of the 897 mishap events). Another common human factors related intervention consists of basic Navy shipboard electrical safety precautions stressed routinely in Navy training. A mishap victim's inattentiveness, complacency, or violations accounts for another 199 (21.47%) of the mishaps (primary cause of 197 (21.96%) of the mishap events). Mishap event reduction and cost savings are estimated for 1 and 5 year periods based on 50, 60, and 70 percent reductions in these failed human factors related interventions as follows:

$$E\left[\text{Mishap Event Reduction}\right] = E\left[N(t)\right] * \%\ \text{Intervention} * \%\ \text{Reduction}$$

$$E\left[\text{Cost Savings}\right] = E\left[C(t)\right] * \%\ \text{Intervention} * \%\ \text{Reduction}$$

Table 19 presents potential reductions in electrical shock mishap events.

| Percent | Years | Tagout | PPE | Both | Inattentiveness | Total | Reduction |
|---|---|---|---|---|---|---|---|
| **50** | 1 | 25.88 | 22.19 | 8.01 | 32.89 | 88.97 | 29.71% |
| | 5 | 129.39 | 110.97 | 40.06 | 164.44 | 444.86 | 29.71% |
| **60** | 1 | 31.05 | 26.63 | 9.61 | 39.46 | 106.77 | 35.65% |
| | 5 | 155.27 | 133.17 | 48.07 | 197.32 | 533.83 | 35.65% |
| **70** | 1 | 36.23 | 31.07 | 11.22 | 46.04 | 124.56 | 41.59% |
| | 5 | 181.15 | 155.36 | 56.09 | 230.21 | 622.81 | 41.59% |

**Table 19. Potential Electrical Shock Mishap Event Reductions**

Table 20 presents potential cost savings of reduced electrical shock mishap events.

| Percent | Years | Tagout | PPE | Both | Inattentiveness | Total |
|---|---|---|---|---|---|---|
| **50** | 1 | $17,653 | $15,140 | $5,466 | $22,434 | $60,693 |
| | 5 | $93,910 | $80,541 | $29,075 | $119,344 | $322,871 |
| **60** | 1 | $21,184 | $18,168 | $6,559 | $26,921 | $72,831 |
| | 5 | $112,692 | $96,649 | $34,890 | $143,213 | $387,446 |
| **70** | 1 | $24,714 | $21,196 | $7,652 | $31,408 | $84,970 |
| | 5 | $131,475 | $112,758 | $40,705 | $167,082 | $452,020 |

**Table 20. Potential Cost Savings of Electrical Shock Mishap Events**

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# V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## A. SUMMARY

Personnel fatalities and injuries can dramatically affect U.S. Navy unit mission capability and operational readiness. Notably, electrical shock mishaps account for 33 percent of all personnel injuries occurring onboard U.S. Navy surface combatants from 1995 to 1997. Clearly this indicates a need for root cause identification and development of intervention strategies to prevent electrical shock. Post-hoc analysis of 897 Special Case Mishap Reports maintained by the Naval Safety Center, involving 927 personnel receiving an electrical shock from 1 January 1995 to 31 December 1997 is conducted in response to this need. The analysis includes initial data exploration, a human factors analysis, and stochastic modeling.

Initial data exploration results in descriptive statistics and categorical data relating to the mishap ship and victim and indicates some very salient features in the data. While one mishap results in a fatality and another in the permanent partial disability of a victim, most mishaps (99.6%) are Class "C" or less in severity. Aircraft Carriers and Combatants (cruisers, destroyers, and frigates) account for the majority of the mishaps (both were 32.0% respectively). Most of the victims are active duty Navy personnel (98.3%) and male (94.3%), and the typical rate of a victim is E-3 to E-5 (76.3%). While 58 different enlisted ratings are involved in electrical shock mishap events, 14 ratings: EM, AT, MM, ET, MS, HT, BM, EN, IC, OS, FC, RM, DC, and AE, account for a majority of the victims (60.8%).

A human factors analysis of the electrical shock mishap data reveals that an individual's decisions, actions, or inactions – is responsible for most of the events

(85.7%). A scenario analysis indicates many victims are involved in corrective maintenance at the time of a mishap (33.6%). The safety literature identifies two primary human factors interventions when working with electrical components and hazards, they are tagout of equipment and PPE. The failure to properly tagout equipment, wear PPE, or a combination of both accounts for a significant number of events (37.0%). Ironically, a mishap victim's inattentiveness, complacency, or violations of basic shipboard electrical safety account for a significant number of the remaining mishaps (21.5%).

Stochastic modeling is used to determine the mishap arrival process. The CY95 – CY96 data is used to formulate the model and the CY97 data is used to verify the model. The electrical shock mishap events are modeled as a Poisson process since this has proved successful in prior mishap studies. The human factors analysis permits the model to be composed of human factors and non-human factors components. Attributes of the Poisson process permit the estimated number of personnel receiving an electrical shock as a result of a mishap event (totaling to over 300 personnel per year) and the costs associated with electrical shock mishap events (over $200,000 per year) to be estimated through a Compound Poisson process. Finally, reductions in the failed human factors related interventions by 50, 60, and 70 percent are considered in the model to estimate their impact on future mishap frequencies and associated costs.

Finally, analysis of the mishap events reveals a wide range of quality inputs by the mishap ships in the mishap reports. Ships are providing what happened but the majority are failing to provide why the mishap occurs. This anomaly can be attributed to a failure of OPNAVINST 5100.19C, the current instruction regarding afloat mishap investigation and reporting, to provide proper reporting guidance. The safety literature indicates a majority of mishap investigation and reporting systems experience the same problem.

## B. CONCLUSIONS

Clearly, initial data exploration and a human factors analysis permits salient features and predictive patterns to be identified in electrical shock mishaps. Aircraft Carriers, possessing the largest crew of any naval vessel, account for the highest number of mishaps (32.0%). The E-3, E-4, and E-5 rates are typically those that perform maintenance or other work activity with associated electrical hazards, and are the most common victims of electrical shocks (76.3%). The Navy's "electrical ratings", EM, AT, and ET, are 3 of the top 4 ratings involved in electrical shock mishaps. The fourth rating, MM, routinely works with electrical components or hazards in the engineering spaces.

The human factors concept of scenario analysis is invaluable in determining the root causes of electrical shock mishaps. Most victims (37.0%) are found to be not following rules and regulations since the two primary human factors causes relate to failed electrical hazard interventions: tagout of equipment and misuse of PPE. In addition, many personnel (21.5%) are not taking shipboard safety regulations seriously since a victim's inattentiveness, complacency, or violations account for a significant number of the remaining events.

Stochastic modeling is a valuable tool and proves statistically that the mishap arrival process can be estimated. As demonstrated in previous mishap studies, modeling mishap events using a Poisson process is an effective technique. Once constructed, the model provides the means to predict expected future mishap frequencies and associated costs. The impact of correcting failed electrical hazard human factors interventions, on future mishap frequencies and associated costs, can be evaluated using the electrical shock mishap model formulated. This study indicates mishap events can be reduced by 19 percent (56 events) in one year with a 50 percent reduction in the failure of personnel to wear PPE or properly tagout equipment. In addition, the model indicates personnel injury costs alone will total over $1,000,000 in the next 5 years without interventions.

The problem associated with the current mishap reporting instruction, OPNAVINST 5100.19C, is its failure to provide direction and guidance on how to report why a mishap occurs. The instructions guidance is not conducive to gathering necessary information for the analysis of human factors related causes attributable to the occurrence of mishap events. In addition, the entry of mishap data into NAVSAFECEN's SIMS database by non-experienced shipboard Navy personnel indicates some discrepancies as to the real causes of mishap events.

## C. RECOMMENDATIONS

Initial data analysis indicates some very salient features of electrical shock mishaps that can be targeted for interventions. With Aircraft Carriers accounting for the highest number of mishaps, a focused electrical safety training and awareness program targeted at Carriers could eventually reduce the overall occurrence of mishap events by as much as 33 percent. In addition the "working rates" of E-3 – E-5, who account for over 75 percent of the mishaps, could also be targeted with focused electrical safety training. Considering a majority of the mishaps occur during corrective maintenance, these "working rates" are prime targets for electrical safety intervention strategies. In addition, the ratings of these rates experiencing a high number of mishaps are primarily the Navy's “electrical ratings”, EM, AT, and ET. Perhaps training, consisting of a basic refresher concerning electrical safety and hazards could alleviate the mishap problem.

Human factors analysis indicates failure of the two primary human factors related interventions, tagout of equipment and PPE, account for a majority of the mishaps. In addition, a victim’s inattentiveness, complacency, or violations account for a majority of the remaining mishap events. These three failure areas are discussed in detail during semi-annual electrical safety training onboard surface ships. Perhaps the solution is not to require training to be conducted quarterly but simply a review of the training syllabus to identify methods for stressing the importance of these basic human factors related electrical safety interventions.

Post-hoc mishap analysis is only as good as the initial mishap report. The current instruction governing afloat mishap investigation and reporting, OPNAVINST 5100.19C, provides a format for reporting what happened but lacks direction on reporting why the mishap occurs. Since this research shows over 85 percent of electrical shock mishaps are attributable to human error, the why of a mishap is necessary to conduct a human factors analysis for root cause identification. It is recommended that NAVSAFECEN revise OPNAVINST 5100.19C and provide better guidance for reporting why the mishap occurred.

Once again, as in previous mishap studies, stochastic modeling through a Poisson process has proven successful. The attributes of this model permit future expected mishap frequencies and associated costs to be calculated through a relatively simple process. Perhaps a standard operating procedure of using this type of model for future mishap studies should be adapted.

Current mishap reporting guidance requires the mishap ship provide a narrative of the mishap event. An analysis of the mishap reports indicates numerous ships fail to discuss tagout of equipment or PPE, two of the primary human factors interventions when working with electrical components and hazards. Analysis indicates 37 percent of electrical shock mishaps are attributable to improper tagout of equipment, misuse of PPE, or a combination of the two. For electrical shock mishaps, ships must specifically state whether these interventions are required and whether they are implemented. In addition, ships are more concerned with describing the outstanding medical care provided to the victim or the excellent electrical safety training program the command possesses. This is not the intent of the mishap report; the intent is to provide NAVSAFECEN with what happened and why it happened. A revision of OPNAVINST 5100.19C would alleviate these issues and provide the necessary information to NAVSAFECEN for post-hoc human factors analysis.

In addition, NAVSAFECEN should consider modifications to their SIMS Database and the procedures for the entry of mishap reports into that database. SIMS is very generic and only provides the user with few options for data entry. For example, a user is only able to enter "personnel error", rather than the form of personnel error. This does not provide a database suitable to valuable queries for human factors analysis. In addition, data entry is not being performed by experienced Navy personnel who can assure the correct cause of mishaps are entered into the database. NAVSAFECEN possesses an outstanding and experienced Navy staff in the Afloat department who can contribute significantly to entry and development of a valuable database for further human factors analysis.

NAVSAFECEN should continue their outstanding approach in providing the fleet with shipboard safety issues through Ship's Safety Bulletins issued monthly and their award winning Fathom Magazine issued bi-monthly. For the prevention of electrical shock mishaps, the bulletins and magazines can focus on the Navy's Tagout and PPE Programs in addition to basic shipboard electrical safety. NAVSAFECEN has already commenced this approach and initial data exploration of CY98 data indicates a reduction in the rate of occurrence of electrical shock mishap events onboard surface combatants.

Finally, there are other high interest personnel injury mishaps that can be pursued. Back injury and toxic substance exposure contribute significantly to the total number of mishaps occurring annually onboard Navy surface combatants. This research indicates mishap events can be stochastically modeled, and through human factors analysis, root causes of mishaps can be identified and subsequently, intervention strategies can be considered, implemented, and evaluated for their effectiveness on future mishap frequencies and associated costs.

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# APPENDIX A. SPECIAL CASE MISHAP REPORT EXAMPLE

Event Serial: XXXXXX Date: XX/XX/XXXX Severity: A OPERATIONAL
DOD Mishap Catg: MARINE - NOT UNDERWAY MISHAP Time: XXXX DAY

Brief Narrative:
SNM WAS FATALLY ELECTROCUTED WHILE ADJ CONN BTWN CABLE/COMPRESSOR.

Event Narrative:
AT APPROX XXXX, WHILE MBR WAS ADJUSTING CONNECTION BETWEEN POWER CABLE AND PORTABLE AIR COMPRESSOR, HE WAS ELECTROCUTED WITH 440 VOLTS 60 HZ, AND RCVD SHOCK IN EXCESS OF 20 SEC. SHIPMATES ON SCENE SECURED POWER SUPPLY AND IMMEDIATELY CONTACTED MEDICAL DEPT. EMERGENCY RESPONSE CORPSMAN WAS ON SCENE WITHIN ONE MINUTE. SHIP'S MEDICAL OFFICER WAS ON SCENE WITHIN 30 SEC OF CORPSMAN'S ARRIVAL. CPR WAS INITIATED IMMEDIATELY. DEFIBRILLATOR WAS ON SCENE WITHIN TWO MINUTES. INITIAL EVALUATION NECESSITATED USE OF DEFIBRILLATOR AND ADVANCED CARDIOPULMONARY LIFE SUPPORT. SECOND MEDICAL OFFICER ARRIVED SHORTLY AFTER INITIATION OF FIRST DEFIBRILLATION. MEDICAL CARE PROVIDED ON SCENE UNTIL ARRIVAL OF AMBULANCE AT APPROX XXXX. AMBULANCE DEPARTED FOR HOSPITAL AT APPROX XXXX. MEDICAL CARE CONTINUED IN AMBULANCE BY SHIP'S SENIOR MEDICAL OFFICER AND INDEPENDENT DUTY CORPSMAN. AMBULANCE ARRIVED AT HOSPITAL AT APPROX XXXX. EMERGENCY MEDICAL CARE CONTINUED UNTIL APPROX XXXX, AT WHICH TIME SVCMBR WAS DECLARED DEAD.

Port or Strait: XXXXXXXXXX

Cost Matrix:

| | | |
|---|---|---|
| Event Injury Cost: | $ | 125,000 |
| Event DOD Property Cost: | $ | 0 |
| Event NON-DOD Property Cost: | $ | 0 |
| Total Event Cost: | $ | 125,000 |

Fatalities/Injuries Occurring in Event:

| | Navy Mil | Navy Fed Civ | Other |
|---|---|---|---|
| Fatality (A,U,L) | 1 | 0 | 0 |
| Perm Total Dis (B) | 0 | 0 | 0 |
| Perm Partial Dis (C) | 0 | 0 | 0 |
| Major Injury (D) | 0 | 0 | 0 |
| Minor Injury (E) | 0 | 0 | 0 |
| First Aid (F) | 0 | 0 | 0 |
| No Injury (G) | 0 | 0 | 0 |
| Missing/Unknown (X) | 0 | 0 | 0 |

Involved Activity: XXXXX
UIC: XXXXXX XX XX Prototype Hull: XX

Ship Status: MOORED (NOT IN SHIPYARD)
Evolution: UPKEEP/AVAILABILITY

Mishap Type: 1 ELECTRICAL (BURN/SHOCK)
2 EQUIPMENT INSTALLATION/REPAIR MAINTENANCE
Mishap Type: 1 ELECTRICAL (BURN/SHOCK)
2 EQUIPMENT INSTALLATION/REPAIR MAINTENANCE

Number of Lost Operating Days for the Activity:      0

Pers Catg: ENLISTED NON-AIRCREW
Service Status: NAVY ACTIVE
Rank/Rate: PO2   Rating: MM2   Paygrade: E05
Sex: X   Age: XX   Duty Status: ON DUTY

Overall Injury: FATAL INJURY
Specific Injuries: (* denotes primary injury)
* Body Part: TOTAL BODY
* Locn: TOTAL BODY
* Diagnosis: ELECTRICAL SHOCK
Osha Occupational Ill? OCCUPATIONAL INJURY

Number of Lost Workdays      0

General Area: ENGINEERING SPACES
Specific Area: MACHINERY ROOM
Job Catg: WATCHSTANDER
Job/Action: INSTALLATION/REMOVAL (EQUIPMENT/MATERIAL)
Experience with this Job/Action: Months   Hrs Awake Prior to Event:
Object Involved: ELECTRICAL APPARATUS
Accident Type: CONTACT WITH ELECTRIC CURRENT
Injury Mishap Type: ELECTRICAL (BURN/SHOCK)
EQUIPMENT INSTALLATION/REPAIR MAINTENANCE

General Cause Factors: PERSONNEL AND MATERIAL

Specific Personnel Cause Factors:
(* denotes injured person injured himself)
* Cause Person Catg: WATCHSTANDER
Job/Action: INSTALLATION/REMOVAL (EQUIPMENT/MATERIAL)
Experience With This Job/Action: Months
What: FAILED TO USE/PROPERLY USE TOOL/EQUIPMENT FOR JOB
Why: LACK OF ABILITY APART FROM TRAINING/EXPERIENCE
Why: INSUFFICIENT EXPERIENCE/SKILL/TRAINING

Cause Person Catg: SUPERVISOR/FOREMAN
Service Status: NAVY ACTIVE   Duty Status: ON DUTY
Job/Action: UNKNOWN/NOT REPORTED
Experience With This Job/Action: Months
What: FAILED TO SUPERVISE PROGRESS OF WORK
Why: LACK OF CONCERN/INTEREST
Why: INADEQUATE KNOWLEDGE OF MEN/EQUIPMENT

Specific Material Cause Factors:
Cause CABLE
Equip: 440V ELECTRICAL CABLE
Was Equip Grounded? NO   Hardwired? NO   Portable? YES
What: SHORTED   Why: IMPROPER TYPE   Why: INSUFFICIENT PMS
Cause COMPRESSOR
Equip: PORTABLE AIR COMPRESSOR
Was Equip Grounded? NO   Hardwired? NO   Portable? YES
What: SHORTED   Why: NOT GROUNDED

Specific Environmental Cause Factors: NO DATA
Specific Procedural Cause Factors: NO DATA

# APPENDIX B. MISHAP DATABASE SUMMARY

The abbreviated database is provided with column categories as follows:

| | |
|---|---|
| Column 1 | date of mishap |
| Column 2 | ship location |
| Column 3 | ship evolution |
| Column 4 | cost of mishap |
| Column 5 | mishap severity |
| Column 6 | fleet ship assigned |
| Column 7 | ship type |
| Column 8 | victim service |
| Column 9 | victim duty status |
| Column 10 | victim rate/rank |
| Column 11 | victim rating |
| Column 12 | victim gender |
| Column 13 | victim age |
| Column 14 | hospitalized days |
| Column 15 | restricted activity days |
| Column 16 | lost work days |
| Column 17 | victim task experience |
| Column 18 | victim prior activity |
| Column 19 | general mishap cause factor |
| Column 20 | specific mishap cause |

(shaded events indicate multiple personnel shocked)

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/2/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | SK | M | 24 | 0 | 0 | 0 | - | T/S | Per | PPE |
| 1/2/95 | yard | ovhl | $1,031 | C | Pac | DD | N | Act | E5 | EN | M | 24 | 1 | 0 | 1 | 48 | Maint | Per | Tag |
| 1/4/95 | inpt | upkp | $147 | D | Pac | AD | N | Act | E4 | ET | M | 22 | 0 | 0 | 0 | 42 | Maint | Per | PPE |
| 1/4/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E2 | IC | M | 22 | 0 | 0 | 0 | - | Wtch | Per | own |
| 1/5/95 | u/w | ISE | $147 | D | Lan | CG | N | Act | E5 | ET | M | 27 | 0 | 0 | 0 | - | T/S | Per | own |
| 1/5/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E6 | EA | M | 20 | 0 | 0 | 0 | 2 | Hsekp | Per | own |
| 1/6/95 | inpt | upkp | $147 | D | Pac | DD | N | Act | E4 | BM | M | 21 | 0 | 0 | 0 | 12 | Train | Per | oth |
| 1/7/95 | anch | upkp | $147 | D | Lan | MCM | N | Act | E5 | STG | M | 34 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 1/9/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | AS | M | 26 | 0 | 0 | 0 | 90 | T/S | Per | Tag |
| 1/9/95 | inpt | upkp | $147 | D | Pac | ARS | N | Act | E8 | QM | M | - | 0 | 0 | 0 | - | Inspt | Mat | n/a |
| 1/13/95 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E4 | STG | M | 23 | 0 | 0 | 0 | 32 | Hsekp | Per | oth |
| 1/13/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | MM | M | 23 | 0 | 0 | 0 | 15 | Wtch | Per | own |
| 1/19/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E5 | FC | M | 24 | 0 | 0 | 0 | 10 | T/S | Per | Tag |
| 1/20/95 | yard | ovhl | $1,031 | C | Pac | DD | N | Act | E3 | GSE | M | 22 | 1 | 0 | 1 | - | T/S | Per | PPE |
| 1/22/95 | u/w | ISE | $147 | D | Lan | AGF | N | Act | E4 | FC | M | 21 | 0 | 0 | 0 | 12 | T/S | Per | PPE |
| 1/23/95 | inpt | upkp | $147 | D | Pac | AD | N | Act | E5 | ET | M | 27 | 0 | 0 | 0 | - | Maint | Per | own |
| 1/23/95 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E2 | SA | M | 20 | 0 | 0 | 0 | 12 | Wtch | Per | oth |
| 1/26/95 | u/w | flops | $147 | D | Pac | LHA | N | Act | E4 | DS | M | 20 | 0 | 0 | 0 | 24 | Maint | Per | both |
| 1/26/95 | inpt | upkp | $147 | D | Lan | AGF | N | TAR | E2 | FA | M | 19 | 0 | 0 | 0 | 4 | Maint | Per | own |
| 1/26/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | 15 | Maint | Per | Tag |
| 1/29/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E3 | FC | M | 22 | 0 | 0 | 0 | 2 | T/S | Per | Tag |
| 1/30/95 | inpt | upkp | $147 | D | Pac | CGN | N | Act | E4 | SH | M | 28 | 0 | 0 | 0 | 24 | Maint | Per | own |
| 2/1/95 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E4 | BM | M | 22 | 0 | 0 | 0 | 18 | T/S | Mat | n/a |
| 2/2/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E2 | AA | M | 19 | 0 | 0 | 0 | 2 | Wtch | Per | own |
| 2/3/95 | inpt | upkp | $230 | D | Lan | LPD | N | Act | E5 | EM | M | 24 | 0 | 1 | 0 | 60 | Maint | Per | Tag |
| 2/3/95 | inpt | upkp | $147 | D | Pac | AGF | N | Act | E5 | EM | M | 24 | 0 | 0 | 0 | 12 | PMS | Per | Tag |
| 2/3/95 | u/w | ISE | $690 | C | Lan | LPD | N | Act | E4 | ET | M | 22 | 0 | 1 | 1 | 48 | T/S | Per | Tag |
| 2/4/95 | inpt | upkp | $1,031 | C | Lan | AO | N | Act | E5 | ET | F | 31 | 1 | 0 | 1 | - | Maint | Per | both |
| 2/5/95 | u/w | ISE | $147 | D | Pac | AS | N | Act | E1 | SR | F | 20 | 0 | 0 | 0 | 1 | Fdprp | Mat | n/a |
| 2/6/95 | inpt | upkp | $147 | D | Lan | CG | N | Act | E7 | EM | M | 34 | 0 | 0 | 0 | - | Train | Mat | n/a |
| 2/8/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E6 | MS | M | 34 | 0 | 0 | 0 | - | Wtch | Mat | n/a |
| 2/9/95 | yard | ovhl | $147 | D | Pac | CG | N | Act | E4 | FC | M | 24 | 0 | 0 | 0 | - | Maint | Per | oth |
| 2/15/95 | yard | upkp | $147 | D | Lan | CV | N | Act | E4 | AT | M | 20 | 0 | 0 | 0 | 6 | Wtch | Per | oth |
| 2/15/95 | yard | upkp | $147 | D | Lan | CV | N | Act | E4 | EM | M | 20 | 0 | 0 | 0 | 8 | Wtch | Per | oth |
| 2/16/95 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E5 | OS | M | 25 | 0 | 0 | 0 | 24 | PMS | Per | PPE |
| 2/16/95 | inpt | upkp | $147 | D | Lan | CGN | N | Act | E6 | MM | M | 25 | 0 | 0 | 0 | - | Maint | Mat | n/a |
| 2/17/95 | inpt | upkp | $147 | D | Pac | AE | N | Act | E4 | MM | F | 21 | 0 | 0 | 0 | 24 | T/S | Per | Tag |
| 2/20/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E7 | MM | M | 31 | 0 | 0 | 0 | 18 | DC | Per | own |
| 2/20/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | MM | M | 23 | 0 | 0 | 0 | 25 | DC | Per | own |
| 2/20/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | MM | M | 23 | 0 | 0 | 0 | 40 | DC | Per | own |
| 2/21/95 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E4 | HT | M | 27 | 0 | 0 | 0 | 30 | Weld | Per | own |
| 2/21/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E2 | MS | F | 25 | 0 | 0 | 0 | - | Hsekp | Per | Tag |
| 2/21/95 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E7 | HT | M | 37 | 0 | 0 | 0 | - | Maint | Per | Tag |
| 2/22/95 | inpt | upkp | $1,031 | C | Lan | FFG | N | Act | E4 | EM | M | 20 | 1 | 0 | 1 | 6 | Maint | Per | PPE |
| 2/22/95 | yard | upkp | $147 | D | Lan | CVN | N | Act | E4 | ABH | M | 22 | 0 | 0 | 0 | 3 | Hsekp | Per | oth |
| 2/22/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AE | M | 24 | 0 | 0 | 0 | 48 | Maint | Per | own |
| 2/22/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E2 | MS | F | 33 | 0 | 0 | 0 | 2 | Hsekp | Per | Tag |
| 2/23/95 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E2 | BT | M | - | 0 | 0 | 0 | 18 | Maint | Per | both |
| 2/24/95 | u/w | ISE | $147 | D | Pac | AE | N | Act | E2 | EM | F | 20 | 0 | 0 | 0 | 2 | Maint | Per | own |
| 2/24/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 25 | 0 | 0 | 0 | 9 | Maint | Per | own |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/25/95 | inpt | upkp | $1,610 | D | Pac | LHA | N | Act | E4 | HT | M | 23 | 0 | 7 | 0 | - | Weld | Per | PPE |
| 3/6/95 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E3 | STG | M | 19 | 0 | 0 | 0 | 6 | Rehab | Per | own |
| 3/6/95 | u/w | ISE | $147 | D | Lan | DD | N | Act | E4 | EM | M | 25 | 0 | 0 | 0 | 24 | PMS | Per | Tag |
| 3/7/95 | inpt | upkp | $147 | D | Pac | AE | N | Act | E5 | RM | M | 28 | 0 | 0 | 0 | 18 | Wtch | Mat | n/a |
| 3/7/95 | inpt | upkp | $147 | D | Pac | AE | N | Act | E4 | RM | M | 23 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 3/8/95 | u/w | ISE | $147 | D | Lan | DD | N | Act | E4 | ET | M | 22 | 0 | 0 | 0 | 60 | T/S | Per | Tag |
| 3/9/95 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E5 | MM | M | 23 | 0 | 0 | 0 | 9 | PMS | Per | Tag |
| 3/10/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | AS | M | 19 | 0 | 0 | 0 | 8 | Maint | Per | PPE |
| 3/14/95 | inpt | upkp | $2,871 | C | Lan | FFG | N | Act | E7 | MM | M | - | 1 | 0 | 5 | 15 | Maint | Mat | n/a |
| 3/14/95 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E3 | SN | M | 22 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 3/16/95 | yard | ovhl | $147 | D | Lan | CV | N | Act | E4 | YN | M | 22 | 0 | 0 | 0 | 24 | Hsekp | Per | oth |
| 3/16/95 | inpt | upkp | $147 | D | Pac | LHA | N | Act | E2 | SA | M | 18 | 0 | 0 | 0 | 2 | PMS | Mat | n/a |
| 3/18/95 | yard | upkp | $147 | D | Lan | LSD | N | Act | E4 | HM | M | 24 | 0 | 0 | 0 | - | Inspt | Per | own |
| 3/21/95 | inpt | upkp | $147 | D | Lan | CV | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | 6 | Wtch | Mat | n/a |
| 3/23/95 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E2 | FA | M | 20 | 0 | 0 | 0 | - | Maint | Per | PPE |
| 3/25/95 | u/w | unrep | $68,206 | C | Lan | AOE | N | Act | E6 | BT | M | 38 | 26 | 180 | 26 | 5 | DC | Per | both |
| 3/26/95 | u/w | unrep | $147 | C | Lan | AOE | N | Act | WO2 | CWO | M | - | 0 | 0 | 0 | - | DC | Per | both |
| 3/27/95 | u/w | ISE | $147 | D | Lan | LHD | N | Act | E5 | OS | M | 32 | 0 | 0 | 0 | 144 | Maint | Per | Tag |
| 3/27/95 | yard | ovhl | $147 | D | Lan | CV | N | Act | E3 | IC | M | 21 | 0 | 0 | 0 | 9 | Maint | Per | Tag |
| 3/29/95 | yard | ovhl | $147 | D | Pac | DD | N | TAR | E3 | SN | M | 26 | 0 | 0 | 0 | - | Wtch | Mat | n/a |
| 3/30/95 | inpt | upkp | $147 | D | Pac | DD | N | Act | E5 | ET | M | 26 | 0 | 0 | 0 | 8 | Maint | Per | own |
| 4/3/95 | inpt | upkp | $147 | D | Lan | CG | N | Act | E5 | MS | M | 26 | 0 | 0 | 0 | 6 | Fdprp | Mat | n/a |
| 4/5/95 | u/w | ISE | $147 | D | Lan | LPD | N | Act | E4 | MS | M | 28 | 0 | 0 | 0 | - | Hsekp | Per | Tag |
| 4/9/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | SA | M | 20 | 0 | 0 | 0 | 18 | Maint | Per | Tag |
| 4/10/95 | u/w | ISE | $690 | C | Lan | FFG | N | Act | E3 | GSE | M | 21 | 0 | 1 | 1 | 18 | Hsekp | Mat | n/a |
| 4/10/95 | inpt | upkp | $147 | D | Lan | DD | N | Act | E5 | STG | M | 22 | 0 | 0 | 0 | 42 | Rehab | Per | own |
| 4/10/95 | u/w | ISE | $690 | C | Lan | FFG | N | Act | E4 | EM | M | 24 | 0 | 1 | 1 | 48 | T/S | Per | Tag |
| 4/12/95 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E5 | EN | M | 26 | 0 | 0 | 0 | 18 | Wtch | Per | Tag |
| 4/12/95 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E4 | GSM | M | 22 | 0 | 0 | 0 | 6 | Wtch | Per | Tag |
| 4/12/95 | yard | ovhl | $147 | D | Lan | LPD | N | Act | E3 | PN | M | 22 | 0 | 0 | 0 | - | Hsekp | Per | oth |
| 4/13/95 | inpt | upkp | $147 | D | Lan | LHA | N | Act | E4 | FC | M | 28 | 0 | 0 | 0 | 10 | Maint | Per | oth |
| 4/13/95 | u/w | flops | $147 | D | Pac | CV | N | Act | E3 | AE | M | - | 0 | 0 | 0 | 12 | Maint | Per | own |
| 4/13/95 | u/w | flops | $147 | D | Pac | CV | N | Act | E4 | AC | M | 21 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 4/14/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | OS | M | 22 | 0 | 0 | 0 | 7 | Hsekp | Per | own |
| 4/15/95 | inpt | upkp | $147 | D | Lan | MHC | N | Act | E7 | EN | M | 33 | 0 | 0 | 0 | - | Maint | Per | PPE |
| 4/14/95 | u/w | ISE | $1,031 | C | Lan | CVN | N | Act | E4 | ET | M | 23 | 1 | 0 | 1 | 42 | Maint | Per | own |
| 4/14/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E5 | AT | M | 25 | 0 | 0 | 0 | 60 | Maint | Per | own |
| 4/20/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | SN | M | 18 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 4/24/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | AO | M | 24 | 0 | 0 | 0 | 24 | Maint | Mat | n/a |
| 4/24/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E3 | AE | M | 21 | 0 | 0 | 0 | 2 | Grind | Per | PPE |
| 4/25/95 | u/w | ISE | $147 | D | Pac | AS | N | Act | E4 | HT | M | 27 | 0 | 0 | 0 | 60 | Weld | Per | PPE |
| 4/26/95 | yard | upkp | $147 | D | Lan | LCC | N | Act | E5 | MS | F | 38 | 0 | 0 | 0 | 1 | Wtch | Per | own |
| 5/1/95 | u/w | ISE | $460 | C | Pac | AOE | N | Act | E3 | SN | M | 22 | 0 | 0 | 1 | 20 | Train | Per | both |
| 5/3/95 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E4 | ET | M | - | 0 | 0 | 0 | 24 | Hsekp | Per | own |
| 5/3/95 | inpt | upkp | $147 | D | Lan | LSD | N | Act | E5 | IC | M | 26 | 0 | 0 | 0 | 24 | T/S | Per | Tag |
| 5/3/95 | u/w | flops | $460 | C | Pac | CVN | N | Act | E5 | AO | M | 24 | 0 | 0 | 1 | 96 | Wtch | Per | own |
| 5/4/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E3 | SN | M | 20 | 0 | 0 | 0 | 2 | Rehab | Per | Tag |
| 5/4/95 | u/w | flops | $147 | D | Pac | unk | N | Act | E4 | AO | M | 24 | 0 | 0 | 0 | 60 | Wtch | Per | oth |
| 5/8/95 | u/w | ISE | $147 | D | Pac | CG | N | Act | E5 | FC | M | 23 | 0 | 0 | 0 | 18 | Maint | Per | own |
| 5/9/95 | u/w | ISE | $147 | D | Lan | CGN | N | Act | E3 | HT | M | 22 | 0 | 0 | 0 | 6 | Weld | Per | PPE |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/10/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | SA | M | 20 | 0 | 0 | 0 | 18 | Maint | Per | Tag |
| 5/12/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | EM | M | 24 | 0 | 0 | 0 | 42 | Maint | Per | both |
| 5/12/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | ET | M | 22 | 0 | 0 | 0 | 12 | Maint | Per | own |
| 5/12/95 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E6 | EN | M | - | 0 | 0 | 0 | 96 | Inspt | Mat | n/a |
| 5/12/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E3 | FN | M | 22 | 0 | 0 | 0 | 9 | Wtch | Per | oth |
| 5/16/95 | inpt | upkp | $147 | D | Lan | LHA | N | Act | E6 | BM | M | - | 0 | 0 | 0 | - | Wtch | Mat | n/a |
| 5/17/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E3 | DC | F | 21 | 0 | 0 | 0 | 7 | Train | Per | PPE |
| 5/17/95 | inpt | upkp | $147 | D | Pac | LHD | N | Act | E3 | FN | M | 19 | 0 | 0 | 0 | 7 | Maint | Per | both |
| 5/17/95 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E5 | ET | M | 28 | 0 | 0 | 0 | 84 | Maint | Per | PPE |
| 5/18/95 | u/w | ISE | $147 | D | Lan | MCM | N | Act | E6 | EN | M | 36 | 0 | 0 | 0 | 108 | Wtch | Per | own |
| 5/18/95 | yard | ovhl | $147 | D | Pac | FFG | N | Act | E3 | RM | M | 21 | 0 | 0 | 0 | 24 | Wtch | Per | oth |
| 5/19/95 | inpt | upkp | $147 | D | Pac | LHA | N | Act | E3 | DC | M | 20 | 0 | 0 | 0 | 24 | PMS | Per | oth |
| 5/21/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | 14 | T/S | Per | own |
| 5/24/95 | yard | conv | $147 | D | Lan | CVN | N | Act | E3 | RM | M | 18 | 0 | 0 | 0 | - | Hsekp | Per | oth |
| 5/24/95 | yard | upkp | $147 | D | Lan | FFG | N | Act | E3 | BM | M | - | 0 | 0 | 0 | 42 | Maint | Per | oth |
| 5/24/95 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E6 | MM | M | 32 | 0 | 0 | 0 | 8 | DC | Per | own |
| 5/26/95 | u/w | ISE | $1,031 | C | Pac | CVN | N | Act | E5 | DS | M | 24 | 1 | 0 | 1 | 60 | Maint | Per | PPE |
| 5/26/95 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | EM | M | 22 | 0 | 0 | 0 | 6 | Maint | Per | PPE |
| 5/26/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | AE | M | 21 | 0 | 0 | 0 | 18 | Maint | Per | own |
| 5/26/95 | inpt | upkp | $460 | C | Lan | DD | N | Act | E5 | GMG | M | 30 | 0 | 0 | 1 | 24 | PMS | Per | oth |
| 5/30/95 | inpt | upkp | $1,721 | C | Lan | MCM | N | Act | E4 | MS | M | 20 | 1 | 1 | 2 | 13 | Hsekp | Per | own |
| 5/30/95 | yard | ovhl | $147 | D | Lan | CV | N | Act | E5 | BM | M | 31 | 0 | 0 | 0 | 62 | Hsekp | Per | oth |
| 6/2/95 | u/w | flops | $460 | D | Pac | CVN | N | Act | E5 | AE | M | 21 | 0 | 2 | 0 | 60 | T/S | Per | own |
| 6/2/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 24 | 0 | 0 | 0 | 24 | T/S | Per | own |
| 6/2/95 | u/w | flops | $147 | D | Lan | CVN | N | Act | E4 | EM | M | 27 | 0 | 0 | 0 | 40 | Hsekp | Per | PPE |
| 6/4/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E4 | DS | M | 33 | 0 | 0 | 0 | 48 | Maint | Mat | n/a |
| 6/6/95 | inpt | upkp | $147 | D | Pac | AS | N | Act | E3 | FN | M | 21 | 0 | 0 | 0 | 20 | T/S | Per | PPE |
| 6/6/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E4 | DS | M | 26 | 0 | 0 | 0 | 1 | Maint | Per | Tag |
| 6/7/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E5 | ET | M | 36 | 0 | 0 | 0 | 33 | Maint | unk | n/a |
| 6/7/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E7 | IC | M | 34 | 0 | 0 | 0 | 165 | Maint | Per | Tag |
| 6/8/95 | inpt | upkp | $147 | D | Lan | LHA | N | Act | E8 | OS | M | 43 | 0 | 0 | 0 | - | Inspt | Mat | n/a |
| 6/11/95 | yard | upkp | $147 | D | Pac | CGN | N | Act | E6 | MM | M | 26 | 0 | 0 | 0 | 36 | Wtch | unk | n/a |
| 6/13/95 | inpt | upkp | $460 | D | Lan | FFG | N | Act | E4 | GSE | M | 20 | 0 | 2 | 0 | - | Maint | Per | PPE |
| 6/13/95 | inpt | upkp | $153,286 | A | Lan | AS | N | Act | E5 | MM | M | 28 | 0 | 0 | Fatal | - | Maint | Per | both |
| 6/13/95 | yard | ovhl | $147 | D | Lan | CV | N | Act | E4 | IC | M | 31 | 0 | 0 | 0 | 264 | Maint | Per | PPE |
| 6/14/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | AT | M | 21 | 0 | 0 | 0 | 5 | T/S | Per | Tag |
| 6/14/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E2 | FA | M | 21 | 0 | 0 | 0 | 11 | T/S | Per | both |
| 6/14/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | DK | F | 22 | 0 | 0 | 0 | 6 | Hsekp | Per | PPE |
| 6/15/95 | inpt | upkp | $147 | D | Lan | LPH | N | Act | E4 | ABF | M | 21 | 0 | 0 | 0 | 5 | Maint | Per | oth |
| 6/17/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | MS | M | 26 | 0 | 0 | 0 | 24 | T/S | Per | both |
| 6/19/95 | inpt | upkp | $147 | D | Pac | CG | N | Act | E7 | EN | M | 37 | 0 | 0 | 0 | 240 | Maint | Per | both |
| 6/19/95 | inpt | upkp | $147 | D | Lan | LSD | N | Act | E4 | EM | M | 23 | 0 | 0 | 0 | 36 | Maint | Mat | n/a |
| 6/19/95 | inpt | upkp | $147 | D | Lan | LSD | N | Act | E5 | EN | M | 24 | 0 | 0 | 0 | - | T/S | Per | own |
| 6/19/95 | u/w | ISE | $147 | D | Lan | AS | N | Act | E4 | IC | M | 21 | 0 | 0 | 0 | 6 | Wtch | Mat | n/a |
| 6/20/95 | inpt | upkp | $147 | D | Pac | AE | N | Act | E4 | BM | M | 26 | 0 | 0 | 0 | 2 | Maint | Per | PPE |
| 6/21/95 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E2 | FA | M | 21 | 0 | 0 | 0 | 22 | Maint | Per | own |
| 6/21/95 | inpt | upkp | $147 | D | Pac | CG | N | Act | E5 | FC | M | 23 | 0 | 0 | 0 | 36 | Maint | Per | Tag |
| 6/22/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E5 | FC | M | 23 | 0 | 0 | 0 | 60 | Wtch | Mat | n/a |
| 6/23/95 | inpt | upkp | $14,815 | C | Pac | FFG | N | Act | E6 | EM | M | 37 | 5 | 0 | 26 | 218 | T/S | Per | both |
| 6/23/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E4 | MS | M | 26 | 0 | 0 | 0 | 3 | Maint | Per | own |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6/26/95 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E5 | EN | M | 30 | 0 | 0 | 0 | 33 | Hsekp | Mat | n/a |
| 6/29/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E6 | ET | M | 27 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 6/29/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E4 | ET | F | 25 | 0 | 0 | 0 | 48 | Maint | Per | own |
| 6/29/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E7 | EM | M | 28 | 0 | 0 | 0 | 144 | Maint | Per | own |
| 6/29/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | O3 | LT | M | 28 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 6/30/95 | inpt | upkp | $1,031 | C | Lan | PC | N | Act | E5 | EM | M | 24 | 1 | 0 | 1 | 5 | Maint | Per | own |
| 6/30/95 | u/w | ISE | $147 | D | Lan | DD | N | Act | E5 | OS | M | 26 | 0 | 0 | 0 | 1 | Wtch | Mat | n/a |
| 7/3/95 | inpt | upkp | $460 | C | Pac | LCC | N | Act | E5 | BM | M | 39 | 0 | 0 | 1 | 24 | Maint | unk | n/a |
| 7/4/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AS | M | 22 | 0 | 0 | 0 | 18 | PMS | Per | Tag |
| 7/4/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AO | F | 24 | 0 | 0 | 0 | 4 | Maint | Per | PPE |
| 7/5/95 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | EN | M | 21 | 0 | 0 | 0 | 20 | Hsekp | Per | oth |
| 7/5/95 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E4 | EN | M | 21 | 0 | 0 | 0 | 40 | Maint | Per | Tag |
| 7/6/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E4 | ET | M | 25 | 0 | 0 | 0 | 24 | Maint | Per | own |
| 7/7/95 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E6 | OS | M | 32 | 0 | 0 | 0 | 69 | Wtch | Mat | n/a |
| 7/8/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E3 | AS | M | 19 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 7/8/95 | inpt | upkp | $147 | D | Lan | LPH | N | Act | E3 | AO | M | 21 | 0 | 0 | 0 | 3 | Maint | Per | Tag |
| 7/11/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E3 | AO | M | 21 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 7/13/95 | inpt | upkp | $147 | D | Pac | DD | N | Act | E4 | MS | M | 26 | 0 | 0 | 0 | 18 | Hsekp | Mat | n/a |
| 7/14/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E6 | EM | M | 30 | 0 | 0 | 0 | 101 | Wtch | Per | own |
| 7/14/95 | yard | ovhl | $460 | C | Lan | DD | N | Act | E4 | HT | M | 22 | 0 | 0 | 1 | 33 | Maint | Per | PPE |
| 7/15/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | HT | M | 24 | 0 | 0 | 0 | 48 | Wtch | Per | oth |
| 7/16/95 | yard | ovhl | $147 | D | Lan | CV | N | Act | E2 | FA | M | 19 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 7/17/95 | yard | ovhl | $147 | D | Lan | CV | N | Act | E3 | AK | M | 21 | 0 | 0 | 0 | - | Wtch | Envr | n/a |
| 7/18/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E4 | STG | M | 24 | 0 | 0 | 0 | 36 | Rehab | unk | n/a |
| 7/18/95 | yard | ovhl | $147 | D | Pac | DD | N | Act | E5 | DC | M | 23 | 0 | 0 | 0 | 60 | Wtch | Per | own |
| 7/18/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AS | M | 20 | 0 | 0 | 0 | 12 | Maint | Per | PPE |
| 7/18/95 | u/w | flops | $460 | C | Lan | CVN | N | Act | E2 | AA | M | 19 | 0 | 0 | 1 | 1 | Wtch | Mat | n/a |
| 7/20/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E3 | IC | M | 20 | 0 | 0 | 0 | 3 | Maint | Per | PPE |
| 7/21/95 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | FC | M | 23 | 0 | 0 | 0 | 8 | Maint | Per | own |
| 7/22/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | 36 | Maint | Per | both |
| 7/22/95 | u/w | ISE | $147 | D | Lan | MCM | N | Act | E6 | ET | M | 33 | 0 | 0 | 0 | 24 | Hsekp | Per | own |
| 7/22/95 | u/w | ISE | $147 | D | Pac | CG | N | Act | E5 | GSE | M | 28 | 0 | 0 | 0 | 96 | T/S | Per | both |
| 7/23/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AMS | M | 24 | 0 | 0 | 0 | 8 | Maint | Per | PPE |
| 7/25/95 | yard | ovhl | $147 | D | Lan | CV | N | Act | E4 | EM | M | 22 | 0 | 0 | 0 | 24 | Maint | Per | PPE |
| 7/25/95 | yard | ovhl | $147 | D | Pac | DD | N | Act | E4 | EN | M | 20 | 0 | 0 | 0 | 4 | Maint | Per | own |
| 7/25/95 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | EM | M | 26 | 0 | 0 | 0 | - | Hsekp | Mat | n/a |
| 7/26/95 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E5 | ET | M | 22 | 0 | 0 | 0 | 24 | Maint | Per | own |
| 7/26/95 | inpt | upkp | $147 | D | Pac | unk | N | Act | E6 | OS | M | 27 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 7/26/95 | inpt | upkp | $147 | D | Pac | LSD | N | Act | O3 | LT | M | 30 | 0 | 0 | 0 | 6 | Inspt | Mat | n/a |
| 7/28/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E2 | SA | M | 20 | 0 | 0 | 0 | 4 | Maint | Per | own |
| 7/29/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E1 | FR | M | 19 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 7/30/95 | u/w | ISE | $460 | C | Pac | LHA | N | Act | E4 | ABF | M | 21 | 0 | 0 | 1 | 24 | Wtch | Mat | n/a |
| 8/3/95 | yard | upkp | $147 | D | Pac | AGF | N | Act | E3 | SN | M | 23 | 0 | 0 | 0 | 6 | Rehab | Per | Tag |
| 8/3/95 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E3 | EM | M | 23 | 0 | 0 | 0 | 36 | Maint | Per | Tag |
| 8/3/95 | u/w | ISE | $147 | D | Pac | AOE | N | Act | E4 | MM | M | 24 | 0 | 0 | 0 | 60 | Maint | Per | Tag |
| 8/4/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E3 | AT | M | 21 | 0 | 0 | 0 | 9 | Maint | Per | own |
| 8/5/95 | u/w | ISE | $1,031 | C | Pac | CVN | N | Act | E5 | AT | M | 24 | 1 | 0 | 1 | 30 | T/S | Per | own |
| 8/7/95 | anch | upkp | $147 | D | Pac | CVN | N | Act | E4 | EM | M | 23 | 0 | 0 | 0 | 4 | PMS | Per | own |
| 8/7/95 | u/w | ISE | $147 | D | Pac | AS | N | Act | E3 | EM | F | 21 | 0 | 0 | 0 | 24 | Maint | Per | Tag |
| 8/7/95 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E4 | IC | M | 22 | 0 | 0 | 0 | 12 | Maint | Per | own |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8/9/95 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E5 | DC | M | 23 | 0 | 0 | 0 | 22 | PMS | Per | both |
| 8/9/95 | inpt | upkp | $147 | D | Pac | CG | N | Act | E5 | IC | M | 23 | 0 | 0 | 0 | 36 | Maint | Mat | n/a |
| 8/9/95 | inpt | ovhl | $147 | D | Pac | DD | N | Act | E4 | EN | M | 23 | 0 | 0 | 0 | 17 | Maint | Per | oth |
| 8/10/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | ABE | M | 24 | 0 | 0 | 0 | 18 | Weld | Per | PPE |
| 8/12/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | O3 | LT | M | 30 | 0 | 0 | 0 | - | Inspt | Per | own |
| 8/15/95 | inpt | upkp | $147 | D | Pac | AOR | N | Act | E3 | AO | M | 22 | 0 | 0 | 0 | 12 | Maint | Per | Tag |
| 8/16/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E5 | HT | M | 35 | 0 | 0 | 0 | 120 | Weld | Per | PPE |
| 8/18/95 | u/w | ISE | $2,760 | C | Lan | LST | N | TAR | E6 | EM | M | 36 | 0 | 10 | 1 | 96 | Maint | Per | both |
| 8/19/95 | u/w | unrep | $147 | D | Lan | AOE | N | Act | E6 | BM | M | 37 | 0 | 0 | 0 | 24 | Wtch | Per | oth |
| 8/19/95 | u/w | unrep | $147 | D | Lan | AOE | N | Act | E1 | SR | M | 20 | 0 | 0 | 0 | 1 | Wtch | Per | oth |
| 8/20/95 | inpt | upkp | $147 | D | Lan | DD | N | Act | E3 | SN | M | 20 | 0 | 0 | 0 | 17 | Rehab | Per | Tag |
| 8/20/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | SA | F | 19 | 0 | 0 | 0 | 12 | Wtch | Mat | n/a |
| 8/21/95 | inpt | upkp | $147 | D | Pac | CGN | N | Act | E5 | ET | M | 22 | 0 | 0 | 0 | 24 | T/S | Per | both |
| 8/21/95 | inpt | upkp | $147 | D | Pac | DD | N | Act | O5 | CDR | M | 49 | 0 | 0 | 0 | 18 | Inspt | Per | oth |
| 8/21/95 | u/w | ISE | $1,031 | C | Pac | LPD | N | Act | E3 | AN | M | 21 | 1 | 0 | 1 | 1 | Hsekp | Per | own |
| 8/23/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E5 | AT | M | 23 | 0 | 0 | 0 | 17 | Maint | Per | own |
| 8/24/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | 3 | T/S | Per | own |
| 8/24/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E5 | EM | M | 41 | 0 | 0 | 0 | 84 | Maint | Per | Tag |
| 8/25/95 | yard | ovhl | $147 | D | Lan | DD | N | Act | E5 | QM | M | 27 | 0 | 0 | 0 | 24 | Rehab | Per | own |
| 8/27/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | 5 | Maint | Per | own |
| 8/28/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | 42 | Wtch | Per | oth |
| 8/28/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | EM | M | 19 | 0 | 0 | 0 | 14 | Maint | Per | Tag |
| 8/28/95 | u/w | ISE | $147 | D | Pac | unk | N | Act | E4 | MS | M | 28 | 0 | 0 | 0 | - | Maint | Per | PPE |
| 8/29/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | ET | M | 23 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 8/29/95 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E5 | EN | M | 27 | 0 | 0 | 0 | 64 | Train | Mat | n/a |
| 8/31/95 | inpt | upkp | $147 | D | Pac | LSD | N | TAR | E4 | BM | M | 21 | 0 | 0 | 0 | 1 | Inspt | Per | own |
| 8/31/95 | inpt | upkp | $147 | D | Pac | LSD | N | TAR | E3 | OS | M | 20 | 0 | 0 | 0 | 6 | Inspt | Mat | n/a |
| 9/1/95 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | BM | M | 22 | 0 | 0 | 0 | 24 | Wtch | Mat | n/a |
| 9/5/95 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E1 | SR | M | 19 | 0 | 0 | 0 | 1 | T/S | Per | PPE |
| 9/6/95 | u/w | ISE | $460 | D | Pac | LSD | N | Act | E5 | BM | M | 28 | 0 | 2 | 0 | 84 | Wtch | Per | own |
| 9/6/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E3 | EM | M | 22 | 0 | 0 | 0 | - | Maint | Per | Tag |
| 9/8/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E3 | AN | M | 20 | 0 | 0 | 0 | 12 | Wtch | unk | n/a |
| 9/9/95 | u/w | ISE | $147 | D | Lan | DD | N | Act | E4 | GSE | M | 24 | 0 | 0 | 0 | 12 | T/S | Per | own |
| 9/11/95 | u/w | ISE | $230 | D | Pac | CVN | N | Act | E3 | AN | F | 23 | 0 | 1 | 0 | 3 | Wtch | Mat | n/a |
| 9/11/95 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E3 | EN | M | 21 | 0 | 0 | 0 | 29 | Maint | Mat | n/a |
| 9/11/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | O3 | LT | M | 35 | 0 | 0 | 0 | - | Maint | Per | oth |
| 9/14/95 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E3 | MS | M | 21 | 0 | 0 | 0 | 18 | Hsekp | Per | own |
| 9/14/95 | u/w | ISE | $147 | D | Lan | DDG | N | Act | E4 | OS | M | 19 | 0 | 0 | 0 | 2 | Maint | Per | Tag |
| 9/14/95 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E4 | GSM | M | 22 | 0 | 0 | 0 | 28 | Maint | Per | own |
| 9/15/95 | yard | ovhl | $230 | D | Pac | DD | N | Act | E3 | FN | M | 19 | 0 | 1 | 0 | 12 | Maint | Per | own |
| 9/15/95 | u/w | ISE | $147 | D | Lan | LPD | N | Act | E3 | FN | M | 21 | 0 | 0 | 0 | 18 | Maint | Mat | n/a |
| 9/18/95 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E4 | EM | M | 21 | 0 | 0 | 0 | 16 | Maint | Per | PPE |
| 9/19/95 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E4 | IC | M | 22 | 0 | 0 | 0 | 24 | Maint | Per | Tag |
| 9/19/95 | inpt | upkp | $147 | D | Lan | DD | N | Act | E2 | RM | M | 22 | 0 | 0 | 0 | 6 | Hsekp | unk | n/a |
| 9/19/95 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E6 | HT | M | 38 | 0 | 0 | 0 | 36 | T/S | Per | own |
| 9/20/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E3 | SN | M | 21 | 0 | 0 | 0 | 24 | Hsekp | Per | own |
| 9/21/95 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | GSE | M | 20 | 0 | 0 | 0 | 12 | Maint | Per | own |
| 9/21/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E2 | IC | M | 20 | 0 | 0 | 0 | 6 | Maint | Per | Tag |
| 9/21/95 | inpt | upkp | $147 | D | Lan | DD | N | Act | E3 | QM | M | 21 | 0 | 0 | 0 | 18 | T/S | Per | Tag |
| 9/21/95 | yard | ovhl | $147 | D | Lan | FFG | N | Act | E5 | ET | M | 22 | 0 | 0 | 0 | 5 | DC | Per | PPE |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/25/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E5 | FC | M | 28 | 0 | 0 | 0 | 120 | Maint | Per | oth |
| 9/25/95 | yard | ovhl | $147 | D | Pac | DD | N | Act | E5 | CTR | F | 33 | 0 | 0 | 0 | 4 | Rehab | Per | own |
| 9/27/95 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E4 | MM | M | 24 | 0 | 0 | 0 | 24 | Maint | Mat | n/a |
| 9/28/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E2 | AE | M | 20 | 0 | 0 | 0 | 2 | Maint | Per | own |
| 9/28/95 | inpt | upkp | $147 | D | Lan | LST | N | Act | E4 | EM | M | 25 | 0 | 0 | 0 | 42 | T/S | Per | own |
| 9/29/95 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E4 | EN | M | 22 | 0 | 0 | 0 | 25 | Hsekp | Per | own |
| 10/2/95 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E4 | ET | M | 20 | 0 | 0 | 0 | 2 | Maint | Per | PPE |
| 10/2/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | MS | M | 26 | 0 | 0 | 0 | 84 | Hsekp | Per | PPE |
| 10/3/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | AT | M | 24 | 0 | 0 | 0 | 60 | T/S | Per | oth |
| 10/5/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | DS | M | 26 | 0 | 0 | 0 | 27 | PMS | Per | own |
| 10/5/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E3 | AE | M | 20 | 0 | 0 | 0 | 14 | Maint | Per | own |
| 10/5/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | FN | F | 19 | 0 | 0 | 0 | 24 | Wtch | Per | oth |
| 10/5/95 | yard | ovhl | $147 | D | Lan | AOE | N | Act | E3 | FN | M | 21 | 0 | 0 | 0 | 5 | Weld | Per | PPE |
| 10/8/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | AE | M | 27 | 0 | 0 | 0 | 114 | Maint | Per | own |
| 10/9/95 | u/w | ISE | $147 | D | Lan | ARS | N | Act | E3 | SN | M | 21 | 0 | 0 | 0 | 1 | Hsekp | Per | Tag |
| 10/10/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E4 | BM | M | 24 | 0 | 0 | 0 | 48 | PMS | Per | own |
| 10/11/95 | inpt | upkp | $147 | D | Lan | AOE | N | Act | E3 | SN | M | 21 | 0 | 0 | 0 | 2 | T/S | Per | PPE |
| 10/11/95 | yard | ovhl | $230 | D | Pac | DD | N | Act | E1 | TM | F | 19 | 0 | 1 | 0 | 4 | Hsekp | Per | oth |
| 10/11/95 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E5 | EM | M | 26 | 0 | 0 | 0 | 78 | T/S | Per | Tag |
| 10/12/95 | u/w | ISE | $147 | D | Lan | CG | N | Act | E2 | SA | M | 23 | 0 | 0 | 0 | 1 | Wtch | Per | own |
| 10/14/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | 12 | DC | Per | own |
| 10/16/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | FN | M | 18 | 0 | 0 | 0 | 8 | Hsekp | Per | oth |
| 10/16/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E5 | OS | M | 22 | 0 | 0 | 0 | 30 | T/S | Per | PPE |
| 10/16/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | OS | M | 24 | 0 | 0 | 0 | 30 | Hsekp | Per | oth |
| 10/17/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | DS | M | 20 | 0 | 0 | 0 | 11 | Maint | Per | oth |
| 10/17/95 | inpt | upkp | $147 | D | Lan | CV | N | Act | E6 | SK | M | 27 | 0 | 0 | 0 | - | Maint | Per | own |
| 10/19/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | AT | M | 21 | 0 | 0 | 0 | 1 | Maint | Per | own |
| 10/23/95 | inpt | upkp | $147 | D | Lan | PC | N | Act | E4 | EM | M | 22 | 0 | 0 | 0 | 15 | T/S | Per | PPE |
| 10/23/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | 30 | T/S | Per | own |
| 10/24/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | ET | F | 25 | 0 | 0 | 0 | - | Maint | Mat | n/a |
| 10/24/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E7 | EM | M | 41 | 0 | 0 | 0 | 6 | Maint | Per | oth |
| 10/26/95 | yard | ovhl | $147 | D | Lan | LPD | N | Act | E3 | FN | M | 21 | 0 | 0 | 0 | 2 | Wtch | Per | own |
| 10/26/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E4 | IC | M | 24 | 0 | 0 | 0 | 10 | Maint | Per | own |
| 10/26/95 | inpt | ovhl | $147 | D | Lan | CVN | N | Act | E4 | AS | M | 24 | 0 | 0 | 0 | 24 | DC | Per | oth |
| 10/27/95 | inpt | upkp | $147 | D | Lan | AD | N | Act | E4 | QM | M | 22 | 0 | 0 | 0 | 30 | Maint | Per | PPE |
| 10/30/95 | inpt | upkp | $147 | D | Lan | CV | N | Act | E5 | MA | F | 26 | 0 | 0 | 0 | 72 | Wtch | unk | n/a |
| 10/30/95 | inpt | upkp | $147 | D | Lan | AGF | N | Act | E4 | BM | M | 28 | 0 | 0 | 0 | 12 | Maint | Per | own |
| 10/31/95 | yard | conv | $147 | D | Lan | CVN | N | Act | E5 | AT | M | 23 | 0 | 0 | 0 | 8 | Maint | Per | Tag |
| 11/1/95 | inpt | upkp | $147 | D | Lan | LSD | N | Act | WO2 | CWO | M | 42 | 0 | 0 | 0 | - | Inspt | Per | oth |
| 11/3/95 | u/w | ISE | $147 | D | Lan | LSD | N | Act | E4 | ET | M | 24 | 0 | 0 | 0 | 23 | Maint | Per | Tag |
| 11/3/95 | u/w | ISE | $147 | D | Lan | AOE | N | Act | E3 | SN | M | 21 | 0 | 0 | 0 | 8 | Hsekp | Per | oth |
| 11/4/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E2 | AA | M | 19 | 0 | 0 | 0 | 14 | Hsekp | Per | oth |
| 11/6/95 | inpt | upkp | $147 | D | Lan | DDG | N | Act | E6 | ET | M | 30 | 0 | 0 | 0 | 24 | T/S | Per | PPE |
| 11/9/95 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E4 | FC | M | 28 | 0 | 0 | 0 | 26 | Maint | Per | own |
| 11/11/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E3 | AMS | M | 20 | 0 | 0 | 0 | 24 | Wtch | Per | oth |
| 11/12/95 | inpt | upkp | $147 | D | Pac | LHA | N | Act | O3 | LT | F | 27 | 0 | 0 | 0 | 1 | Wtch | Per | own |
| 11/13/95 | u/w | ISE | $147 | D | Lan | AS | N | Act | E5 | BM | M | 30 | 0 | 0 | 0 | 120 | Maint | Per | Tag |
| 11/16/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E5 | DP | F | 27 | 0 | 0 | 0 | 6 | Hsekp | Per | oth |
| 11/17/95 | inpt | upkp | $147 | D | Pac | AGF | N | Act | E5 | MM | M | 34 | 0 | 0 | 0 | 24 | T/S | Mat | n/a |
| 11/18/95 | u/w | ISE | $147 | D | Pac | LHA | M | Act | E3 | LCPL | M | 22 | 0 | 0 | 0 | 37 | T/S | Per | own |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/22/95 | inpt | upkp | $147 | D | Lan | CGN | N | Act | E4 | CTR | M | 26 | 0 | 0 | 0 | - | Rehab | Mat | n/a |
| 11/28/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E2 | FA | M | 20 | 0 | 0 | 0 | 13 | Maint | Per | own |
| 11/30/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E3 | AE | M | 24 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 11/30/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | AT | M | 23 | 0 | 0 | 0 | 48 | Maint | Per | own |
| 12/1/95 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | IC | M | 19 | 0 | 0 | 0 | - | T/S | Per | PPE |
| 12/1/95 | u/w | ISE | $1,031 | C | Pac | LHA | N | Act | E4 | IM | M | 38 | 1 | 0 | 1 | 180 | T/S | Per | own |
| 12/2/95 | inpt | upkp | $147 | D | Lan | CV | N | Act | E6 | SM | F | 30 | 0 | 0 | 0 | 208 | Maint | Per | PPE |
| 12/2/95 | inpt | upkp | $147 | D | Lan | FFG | N | TAR | E4 | ET | M | 21 | 0 | 0 | 0 | - | Maint | Per | Tag |
| 12/2/95 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E6 | EN | M | 36 | 0 | 0 | 0 | - | Maint | Per | Tag |
| 12/2/95 | u/w | ISE | $460 | C | Lan | CV | N | Act | E3 | MS | M | 21 | 0 | 0 | 1 | 6 | Wtch | Mat | n/a |
| 12/3/95 | u/w | ISE | $147 | D | Lan | LPH | N | Act | E5 | EW | M | 24 | 0 | 0 | 0 | 24 | Wtch | Per | own |
| 12/3/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E3 | MS | M | - | 0 | 0 | 0 | 50 | Fdprp | Per | own |
| 12/4/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | AT | M | 29 | 0 | 0 | 0 | 24 | Maint | Per | own |
| 12/5/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E6 | AT | M | 39 | 0 | 0 | 0 | - | Wtch | Mat | n/a |
| 12/6/95 | u/w | ISE | $147 | D | Lan | LHA | N | Act | E5 | QM | M | 39 | 0 | 0 | 0 | 18 | Wtch | Per | own |
| 12/6/95 | inpt | upkp | $147 | D | Pac | CV | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 12/8/95 | u/w | ISE | $147 | D | Lan | DD | N | Act | E3 | FN | M | 21 | 0 | 0 | 0 | 24 | Maint | Per | Tag |
| 12/7/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E6 | AT | M | 27 | 0 | 0 | 0 | 18 | Maint | Per | own |
| 12/8/95 | u/w | ISE | $147 | D | Lan | DD | N | Act | E6 | SM | M | 31 | 0 | 0 | 0 | 38 | Hsekp | Per | own |
| 12/8/95 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E6 | SH | M | 39 | 0 | 0 | 0 | 1 | PMS | Per | Tag |
| 12/9/95 | anch | upkp | $690 | C | Pac | DDG | N | Act | E6 | GSM | M | 35 | 0 | 1 | 1 | 12 | Wtch | Per | own |
| 12/11/95 | inpt | upkp | $1,031 | C | Lan | LSD | N | Act | E3 | EM | M | 20 | 1 | 0 | 1 | 6 | Maint | Per | oth |
| 12/11/95 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | AO | M | 28 | 0 | 0 | 0 | 60 | Wtch | Per | own |
| 12/11/95 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | SN | M | 20 | 0 | 0 | 0 | 19 | PMS | Per | oth |
| 12/12/95 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E3 | SN | M | 20 | 0 | 0 | 0 | 1 | Maint | Per | PPE |
| 12/12/95 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E5 | IC | M | 30 | 0 | 0 | 0 | 12 | T/S | Per | Tag |
| 12/13/95 | u/w | ISE | $147 | D | Lan | CV | N | Act | E3 | AN | M | 25 | 0 | 0 | 0 | 14 | Wtch | Per | own |
| 12/14/95 | inpt | upkp | $147 | D | Lan | CV | N | Act | E5 | SK | M | 26 | 0 | 0 | 0 | 12 | PMS | Per | PPE |
| 12/14/95 | inpt | upkp | $147 | D | Pac | LCC | N | Act | E4 | ET | M | 23 | 0 | 0 | 0 | 6 | T/S | Per | Tag |
| 12/16/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AT | M | 24 | 0 | 0 | 0 | 30 | Maint | Mat | n/a |
| 12/22/95 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E4 | IC | M | 21 | 0 | 0 | 0 | 18 | T/S | Per | both |
| 12/27/95 | inpt | upkp | $147 | D | Lan | MHC | N | Act | E4 | MN | M | 22 | 0 | 0 | 0 | 36 | Maint | Per | Tag |
| 12/28/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AE | M | 25 | 0 | 0 | 0 | 36 | T/S | Per | PPE |
| 12/29/95 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E2 | SA | M | 19 | 0 | 0 | 0 | 12 | Maint | Per | own |
| 1/1/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E7 | GM | M | 37 | 0 | 0 | 0 | 28 | Wtch | Per | oth |
| 1/3/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E3 | AO | M | 21 | 0 | 0 | 0 | 24 | Hsekp | Per | PPE |
| 1/3/96 | inpt | upkp | $147 | D | Pac | CVN | N | Act | E3 | FN | M | 22 | 0 | 0 | 0 | 25 | Maint | Per | Tag |
| 1/10/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | AS | M | 20 | 0 | 0 | 0 | 7 | Maint | Per | own |
| 1/11/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | IC | M | 27 | 0 | 0 | 0 | 60 | T/S | Per | PPE |
| 1/12/96 | yard | upkp | $147 | D | Lan | MHC | N | Act | E4 | EN | M | 21 | 0 | 0 | 0 | - | Maint | Per | oth |
| 1/13/96 | inpt | upkp | $147 | D | Pac | LHD | N | Act | E4 | AS | M | 23 | 0 | 0 | 0 | 30 | Maint | Per | own |
| 1/16/96 | u/w | ISE | $147 | D | Pac | DD | N | Act | E4 | TM | M | 21 | 0 | 0 | 0 | 20 | Grind | Per | PPE |
| 1/16/96 | inpt | upkp | $147 | D | Lan | AOE | N | Act | E3 | GMG | M | 22 | 0 | 0 | 0 | 24 | Hsekp | Per | own |
| 1/17/96 | inpt | upkp | $147 | D | Lan | LPH | N | Act | E4 | ET | M | 19 | 0 | 0 | 0 | 6 | PMS | Per | both |
| 1/18/96 | inpt | upkp | $147 | D | Pac | AS | N | Act | E4 | HT | M | 25 | 0 | 0 | 0 | 36 | Wtch | Per | oth |
| 1/18/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E3 | FN | M | 28 | 0 | 0 | 0 | 12 | Weld | Per | own |
| 1/22/96 | inpt | upkp | $147 | D | Pac | LHD | N | Act | E4 | ET | M | 27 | 0 | 0 | 0 | 36 | T/S | Per | PPE |
| 1/22/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | IC | M | 25 | 0 | 0 | 0 | 36 | T/S | Per | Tag |
| 1/22/96 | u/w | ISE | $147 | D | Pac | DD | N | Act | E4 | EM | M | 23 | 0 | 0 | 0 | 10 | T/S | Mat | n/a |
| 1/25/96 | inpt | upkp | $460 | C | Pac | PC | N | Act | E4 | GMG | M | 26 | 0 | 0 | 1 | 20 | PMS | Per | own |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/26/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E5 | GSE | M | 22 | 0 | 0 | 0 | 18 | Maint | Per | Tag |
| 1/27/96 | u/w | ISE | $147 | D | Lan | CV | N | Act | E3 | AN | M | 21 | 0 | 0 | 0 | - | Hsekp | Per | own |
| 1/28/96 | u/w | ISE | $147 | D | Lan | LPD | N | Act | E1 | MM | M | 25 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 1/29/96 | inpt | upkp | $147 | D | Pac | DD | N | Act | E5 | GSM | M | 26 | 0 | 0 | 0 | 12 | Maint | Per | Tag |
| 1/29/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | O1 | ENS | M | 23 | 0 | 0 | 0 | 13 | Maint | Per | own |
| 1/30/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E6 | GSM | M | 33 | 0 | 0 | 0 | - | Maint | Per | own |
| 1/31/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E2 | SA | M | 20 | 0 | 0 | 0 | 3 | Hsekp | Per | PPE |
| 2/2/96 | anch | upkp | $1,031 | C | Pac | LHA | N | Act | E4 | MS | M | 20 | 1 | 0 | 1 | 14 | Fdprp | Mat | n/a |
| 2/3/96 | u/w | ISE | $147 | D | Lan | LPD | N | Act | E1 | FR | M | 20 | 0 | 0 | 0 | 2 | Hsekp | Per | own |
| 2/4/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | MS | M | 21 | 0 | 0 | 0 | 16 | Wtch | Per | oth |
| 2/5/96 | u/w | ISE | $460 | C | Lan | FFG | N | Act | E2 | FA | M | 21 | 0 | 0 | 1 | 1 | Maint | Per | both |
| 2/5/96 | u/w | ISE | $460 | C | Pac | LHA | M | Act | E3 | LCPL | M | 19 | 0 | 0 | 1 | - | Maint | Per | Tag |
| 2/7/96 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E1 | MS | M | 25 | 0 | 0 | 0 | 5 | Hsekp | Per | own |
| 2/9/96 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E4 | ET | M | 21 | 0 | 0 | 0 | 3 | PMS | Per | own |
| 2/9/96 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E1 | DC | M | 18 | 0 | 0 | 0 | 1 | Maint | Per | own |
| 2/9/96 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E3 | DC | M | - | 0 | 0 | 0 | 16 | Maint | Per | own |
| 2/13/96 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E3 | MS | M | 20 | 0 | 0 | 0 | 22 | Fdprp | Per | oth |
| 2/14/96 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E4 | MM | M | 21 | 0 | 0 | 0 | 10 | T/S | Per | Tag |
| 2/15/96 | u/w | flops | $147 | D | Pac | CVN | N | Act | E4 | AO | M | 22 | 0 | 0 | 0 | 36 | Wtch | Per | own |
| 2/15/96 | yard | ovhl | $147 | D | Pac | DDG | N | Act | E1 | SR | F | 19 | 0 | 0 | 0 | 3 | Wtch | Per | oth |
| 2/16/96 | inpt | upkp | $147 | D | Pac | DD | N | Act | E4 | EM | M | 25 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 2/17/96 | u/w | ISE | $147 | D | Pac | LCC | N | Act | E4 | OS | M | 27 | 0 | 0 | 0 | 6 | Weld | Per | PPE |
| 2/19/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 21 | 0 | 0 | 0 | 1 | Maint | Per | own |
| 2/20/96 | inpt | upkp | $147 | D | Pac | LHA | N | Act | E4 | AMH | M | - | 0 | 0 | 0 | 24 | T/S | Per | Tag |
| 2/22/96 | yard | ovhl | $147 | D | Lan | AOE | N | Act | E4 | BT | M | 22 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 2/23/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | AT | M | 35 | 0 | 0 | 0 | 18 | Maint | Per | own |
| 2/23/96 | u/w | flops | $147 | D | Pac | CVN | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | 18 | T/S | Per | own |
| 2/23/96 | inpt | upkp | $920 | C | Lan | MCM | N | Act | E6 | EN | M | 32 | 0 | 0 | 2 | 11 | T/S | Per | own |
| 2/26/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E4 | EM | M | 23 | 0 | 0 | 0 | 23 | Maint | Per | Tag |
| 2/28/96 | u/w | ISE | $147 | D | Lan | AS | N | Act | E4 | IC | F | 21 | 0 | 0 | 0 | 30 | Maint | Per | oth |
| 2/29/96 | yard | ovhl | $147 | D | Lan | FFG | N | Act | E6 | SM | M | 29 | 0 | 0 | 0 | 108 | Train | Per | oth |
| 3/1/96 | u/w | ISE | $147 | D | Lan | LHA | N | Act | E4 | DC | M | 20 | 0 | 0 | 0 | 24 | Wtch | Mat | n/a |
| 3/2/96 | anch | upkp | $147 | D | Pac | LST | N | Act | E6 | BM | M | 32 | 0 | 0 | 0 | 24 | Wtch | Per | own |
| 3/3/96 | anch | upkp | $147 | D | Lan | FFG | N | Act | E5 | ET | M | 24 | 0 | 0 | 0 | 72 | T/S | unk | n/a |
| 3/4/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E6 | RM | M | 32 | 0 | 0 | 0 | 156 | Maint | Per | own |
| 3/5/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | MS | M | 25 | 0 | 0 | 0 | 36 | Fdprp | Per | own |
| 3/5/96 | yard | ovhl | $147 | D | Lan | MCM | N | Act | E5 | MN | M | 27 | 0 | 0 | 0 | 48 | T/S | Per | Tag |
| 3/6/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | MM | M | 22 | 0 | 0 | 0 | 36 | Maint | Per | oth |
| 3/6/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | MM | M | 21 | 0 | 0 | 0 | 24 | Maint | Per | oth |
| 3/7/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E3 | AN | F | 19 | 0 | 0 | 0 | 5 | Wtch | Per | oth |
| 3/7/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E4 | ABH | M | 21 | 0 | 0 | 0 | 30 | Wtch | Per | own |
| 3/8/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E4 | MR | M | 21 | 0 | 0 | 0 | 19 | Hsekp | Mat | n/a |
| 3/11/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E5 | DC | M | 20 | 0 | 0 | 0 | 47 | Train | Per | oth |
| 3/12/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | AT | M | 21 | 0 | 0 | 0 | 12 | Maint | Per | own |
| 3/12/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | HM | M | 23 | 0 | 0 | 0 | 35 | Hsekp | Per | oth |
| 3/13/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | GMM | M | 25 | 0 | 0 | 0 | 4 | Maint | Per | own |
| 3/14/96 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E4 | EM | M | 21 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 3/14/96 | u/w | ISE | $147 | D | Lan | CG | N | Act | E5 | MS | M | 27 | 0 | 0 | 0 | 36 | T/S | Per | both |
| 3/18/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | ET | M | 21 | 0 | 0 | 0 | 18 | Maint | Per | Tag |
| 3/19/96 | yard | ovhl | $147 | D | Pac | DD | N | Act | E4 | CTR | M | 22 | 0 | 0 | 0 | 10 | Rehab | Per | oth |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/19/96 | inpt | upkp | $147 | D | Lan | DDG | N | Act | E5 | FC | M | 23 | 0 | 0 | 0 | 12 | PMS | Per | PPE |
| 3/21/96 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E3 | SN | M | 21 | 0 | 0 | 0 | 8 | Wtch | Per | oth |
| 3/21/96 | inpt | upkp | $147 | D | Pac | AGF | N | Act | E4 | MM | M | 25 | 0 | 0 | 0 | 42 | Maint | Per | Tag |
| 3/22/96 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | AT | M | 25 | 0 | 0 | 0 | 5 | Maint | Mat | n/a |
| 3/25/96 | inpt | upkp | $147 | D | Lan | CG | N | Act | E4 | FC | M | 20 | 0 | 0 | 0 | 24 | PMS | Per | own |
| 3/26/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E5 | GMM | M | 26 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 3/27/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | OS | M | 22 | 0 | 0 | 0 | 24 | Wtch | Per | own |
| 3/27/96 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | IC | M | 21 | 0 | 0 | 0 | 24 | Hsekp | Per | PPE |
| 3/30/96 | inpt | upkp | $1,380 | C | Lan | LCC | N | Act | E3 | HT | M | 20 | 0 | 2 | 2 | 23 | Weld | Per | PPE |
| 4/1/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E4 | SH | F | 23 | 0 | 0 | 0 | - | Maint | Per | oth |
| 4/1/96 | u/w | flops | $147 | D | Pac | CVN | N | Act | E2 | AME | M | 22 | 0 | 0 | 0 | 7 | Maint | Per | oth |
| 4/3/96 | yard | ovhl | $147 | D | Pac | AOE | N | Act | E3 | SN | M | 22 | 0 | 0 | 0 | 2 | Wtch | Per | own |
| 4/4/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | MM | M | 23 | 0 | 0 | 0 | 40 | Hsekp | Per | own |
| 4/4/96 | u/w | ISE | $147 | D | Pac | T-AO | N | Act | E3 | OS | M | 21 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 4/7/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | GMG | M | 22 | 0 | 0 | 0 | 12 | Wtch | Mat | n/a |
| 4/7/96 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E3 | FN | M | 23 | 0 | 0 | 0 | 12 | T/S | Per | oth |
| 4/8/96 | inpt | upkp | $147 | D | Lan | CV | N | Act | E5 | AMH | M | 28 | 0 | 0 | 0 | - | Maint | Per | PPE |
| 4/8/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E3 | SN | M | 20 | 0 | 0 | 0 | 24 | Wtch | Per | own |
| 4/8/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E4 | IC | M | 23 | 0 | 0 | 0 | 36 | Wtch | Per | oth |
| 4/10/96 | u/w | ISE | $147 | D | Lan | AS | N | Act | E3 | HT | M | 21 | 0 | 0 | 0 | 24 | PMS | Mat | n/a |
| 4/14/96 | inpt | upkp | $147 | D | Pac | AS | N | Act | E6 | HT | M | 29 | 0 | 0 | 0 | 22 | Weld | Per | PPE |
| 4/14/96 | u/w | flops | $147 | D | Pac | CVN | N | Act | E4 | AMS | M | 21 | 0 | 0 | 0 | 15 | Maint | Per | own |
| 4/14/96 | u/w | flops | $147 | D | Pac | CVN | N | Act | E3 | AN | F | 25 | 0 | 0 | 0 | 15 | Wtch | Per | Tag |
| 4/15/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | AT | M | 20 | 0 | 0 | 0 | - | PMS | Per | own |
| 4/16/96 | inpt | upkp | $147 | D | Lan | LCC | N | Act | E4 | DS | M | 23 | 0 | 0 | 0 | 12 | PMS | Per | own |
| 4/17/96 | yard | ovhl | $147 | D | Pac | CVN | N | Act | E3 | FN | M | 24 | 0 | 0 | 0 | 5 | Maint | Per | oth |
| 4/18/96 | u/w | ISE | $1,031 | C | Lan | DD | N | Act | E3 | SN | M | 20 | 1 | 0 | 1 | 17 | Grind | Per | own |
| 4/21/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E6 | MM | M | 30 | 0 | 0 | 0 | 120 | Wtch | Per | own |
| 4/23/96 | inpt | upkp | $147 | D | Lan | AGF | N | Act | E4 | BM | M | 22 | 0 | 0 | 0 | 32 | Hsekp | Per | oth |
| 4/23/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E5 | MM | M | 27 | 0 | 0 | 0 | 24 | Hsekp | Mat | n/a |
| 4/24/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E3 | AN | M | 20 | 0 | 0 | 0 | 7 | Wtch | unk | n/a |
| 4/25/96 | inpt | upkp | $147 | D | Lan | MCM | N | TAR | E6 | ET | M | 43 | 0 | 0 | 0 | 11 | PMS | Per | own |
| 4/25/96 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E5 | DC | M | 21 | 0 | 0 | 0 | 49 | PMS | Per | Tag |
| 4/26/96 | u/w | ISE | $1,031 | C | Lan | DDG | N | Act | E3 | SN | M | 21 | 1 | 0 | 1 | 36 | Hsekp | Per | oth |
| 4/27/96 | u/w | ISE | $147 | D | Lan | CVN | M | Act | E3 | LCPL | M | 19 | 0 | 0 | 0 | - | Wtch | Per | both |
| 4/30/96 | inpt | upkp | $147 | D | Lan | CG | N | Act | E2 | SA | M | 20 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 4/30/96 | yard | ovhl | $460 | C | Lan | DD | N | Act | E3 | FN | M | 20 | 0 | 0 | 1 | 24 | Maint | Per | oth |
| 5/1/96 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E5 | OS | M | 26 | 0 | 0 | 0 | 12 | Wtch | Per | own |
| 5/2/96 | u/w | ISE | $147 | D | Lan | DD | N | Act | E4 | EM | M | 24 | 0 | 0 | 0 | 48 | Maint | Per | own |
| 5/2/96 | u/w | ISE | $147 | D | Lan | DD | N | Act | E3 | EM | M | 21 | 0 | 0 | 0 | 18 | Maint | Per | own |
| 5/4/96 | u/w | ISE | $147 | D | Lan | CV | N | Act | E5 | DS | M | 36 | 0 | 0 | 0 | 23 | Maint | Per | PPE |
| 5/5/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | - | Maint | Per | PPE |
| 5/5/96 | u/w | ISE | $147 | D | Lan | DD | N | Act | E5 | DS | M | 26 | 0 | 0 | 0 | 48 | T/S | Per | PPE |
| 5/6/96 | yard | ovhl | $147 | D | Lan | LPH | N | Act | E5 | OS | M | 23 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 5/7/96 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E5 | ET | M | 30 | 0 | 0 | 0 | 30 | Maint | Per | own |
| 5/7/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E1 | SR | F | 19 | 0 | 0 | 0 | - | Wtch | Per | own |
| 5/13/96 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E2 | SM | M | 20 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 5/15/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | AK | M | - | 0 | 0 | 0 | 42 | Maint | Per | PPE |
| 5/20/96 | inpt | upkp | $147 | D | Lan | AD | N | Act | E5 | ET | F | 28 | 0 | 0 | 0 | 84 | Maint | Per | PPE |
| 5/20/96 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E4 | GMM | M | 22 | 0 | 0 | 0 | 47 | Maint | Per | own |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/20/96 | inpt | upkp | $147 | D | Lan | AOE | N | Act | E3 | FN | M | 21 | 0 | 0 | 0 | 12 | Maint | Per | Tag |
| 5/20/96 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | HT | M | 26 | 0 | 0 | 0 | 14 | Weld | Per | PPE |
| 5/22/96 | u/w | ISE | $690 | C | Lan | CVN | N | Act | E4 | IC | M | 22 | 0 | 1 | 1 | 27 | T/S | Per | own |
| 5/23/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | SN | F | 24 | 0 | 0 | 0 | 4 | Maint | Mat | n/a |
| 5/24/96 | u/w | s/a | $147 | D | Pac | FFG | N | Act | E4 | OS | M | 23 | 0 | 0 | 0 | 31 | Wtch | Per | oth |
| 5/24/96 | u/w | s/a | $147 | D | Lan | MHC | N | Act | E3 | SN | M | 21 | 0 | 0 | 0 | 6 | Wtch | Mat | n/a |
| 5/24/96 | yard | ovhl | $147 | D | Pac | LHD | N | Act | E6 | IC | M | 41 | 0 | 0 | 0 | 144 | T/S | Mat | n/a |
| 5/26/96 | u/w | ISE | $147 | D | Lan | CG | N | Act | E3 | OS | M | 20 | 0 | 0 | 0 | 3 | Wtch | Per | oth |
| 5/29/96 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E5 | MS | M | 37 | 0 | 0 | 0 | 7 | Fdprp | Mat | n/a |
| 5/29/96 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E5 | EM | M | 31 | 0 | 0 | 0 | 12 | T/S | Per | own |
| 5/30/96 | u/w | ISE | $147 | D | Pac | LHD | N | Act | E4 | MM | M | 21 | 0 | 0 | 0 | 24 | Maint | Mat | n/a |
| 5/30/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | O2 | LTjg | F | 24 | 0 | 0 | 0 | 24 | T/S | Per | oth |
| 5/30/96 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E3 | BM | M | 25 | 0 | 0 | 0 | 42 | Wtch | Per | own |
| 5/31/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E5 | AT | M | 29 | 0 | 0 | 0 | 18 | PMS | Per | own |
| 5/31/96 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E5 | HT | M | 26 | 0 | 0 | 0 | 32 | Weld | Per | PPE |
| 6/3/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E5 | AT | M | 27 | 0 | 0 | 0 | 10 | Maint | Per | oth |
| 6/3/96 | yard | upkp | $147 | D | Lan | DD | N | Act | E4 | FC | M | 23 | 0 | 0 | 0 | 12 | PMS | Mat | n/a |
| 6/3/96 | inpt | upkp | $147 | D | Lan | AOE | N | Act | E6 | BM | M | 32 | 0 | 0 | 0 | - | Wtch | Mat | n/a |
| 6/4/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E2 | AE | M | 21 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 6/5/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E5 | EM | M | 24 | 0 | 0 | 0 | 36 | Inspt | Mat | n/a |
| 6/7/96 | yard | ovhl | $460 | C | Lan | DD | N | Act | E4 | FC | M | 24 | 0 | 0 | 1 | 49 | Wtch | Per | oth |
| 6/9/96 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E6 | HM | M | 39 | 0 | 0 | 0 | 12 | Wtch | Per | own |
| 6/10/96 | anch | upkp | $147 | D | Pac | CVN | N | Act | E5 | QM | M | 36 | 0 | 0 | 0 | 24 | Wtch | Per | own |
| 6/11/96 | u/w | ISE | $460 | C | Pac | LPD | N | Act | E5 | BM | M | 31 | 0 | 0 | 1 | 48 | Weld | Per | PPE |
| 6/12/96 | yard | ovhl | $147 | D | Lan | CGN | N | Act | O2 | LTjg | M | 25 | 0 | 0 | 0 | 8 | Wtch | Mat | n/a |
| 6/13/96 | u/w | ISE | $147 | D | Pac | CGN | N | Act | E6 | MM | M | - | 0 | 0 | 0 | 60 | Wtch | Per | own |
| 6/13/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | AT | M | - | 0 | 0 | 0 | 60 | Maint | Per | own |
| 6/15/96 | u/w | ISE | $147 | D | Lan | LPD | N | Act | E1 | FR | M | 19 | 0 | 0 | 0 | 18 | Rehab | Per | Tag |
| 6/22/96 | u/w | ISE | $147 | D | Pac | CGN | N | Act | E5 | MM | M | 30 | 0 | 0 | 0 | 36 | PMS | Mat | n/a |
| 6/23/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | MS | F | 21 | 0 | 0 | 0 | 13 | Fdprp | Per | own |
| 6/24/96 | u/w | ISE | $147 | D | Lan | LPH | M | Act | E4 | CPL | M | 26 | 0 | 0 | 0 | 42 | Maint | Per | own |
| 6/25/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | MM | M | 21 | 0 | 0 | 0 | 36 | Wtch | Per | own |
| 6/27/96 | inpt | upkp | $147 | D | Pac | LPH | N | Act | E4 | BT | M | 22 | 0 | 0 | 0 | 24 | Maint | Per | own |
| 6/29/96 | u/w | ISE | $147 | D | Pac | CGN | N | Act | E6 | MM | M | 31 | 0 | 0 | 0 | 9 | Maint | Per | oth |
| 7/2/96 | u/w | ISE | $147 | D | Pac | LPD | N | Act | E2 | FA | M | 21 | 0 | 0 | 0 | 15 | Maint | Per | Tag |
| 7/3/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AE | M | 20 | 0 | 0 | 0 | 7 | Maint | Per | own |
| 7/5/96 | u/w | ISE | $147 | D | Pac | CGN | N | Act | E1 | QM | M | 18 | 0 | 0 | 0 | 3 | Wtch | Per | oth |
| 7/6/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 22 | 0 | 0 | 0 | 12 | T/S | Per | own |
| 7/7/96 | yard | ovhl | $230 | D | Pac | AOE | N | Act | E4 | EN | M | 22 | 0 | 1 | 0 | 26 | Maint | Per | Tag |
| 7/10/96 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E4 | HT | M | 22 | 0 | 0 | 0 | - | Weld | Per | PPE |
| 7/11/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E4 | MR | M | 20 | 0 | 0 | 0 | 21 | Wtch | Per | Tag |
| 7/15/96 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E1 | SR | M | 23 | 0 | 0 | 0 | 2 | Hsekp | Mat | n/a |
| 7/16/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | MM | M | - | 0 | 0 | 0 | 20 | Maint | Per | own |
| 7/17/96 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E3 | EM | M | 31 | 0 | 0 | 0 | 11 | Maint | Per | Tag |
| 7/17/96 | inpt | upkp | $147 | D | Lan | CGN | N | Act | E4 | MM | M | 23 | 0 | 0 | 0 | 32 | Wtch | Per | both |
| 7/21/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E4 | ABH | M | 23 | 0 | 0 | 0 | 26 | Wtch | Mat | n/a |
| 7/23/96 | yard | ovhl | $920 | C | Pac | CVN | N | Act | E5 | AW | M | 21 | 0 | 0 | 2 | 36 | Weld | Per | PPE |
| 7/24/96 | yard | ovhl | $147 | D | Pac | CVN | N | Act | E4 | QM | F | 22 | 0 | 0 | 0 | 9 | Hsekp | Per | own |
| 7/25/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | GSM | M | 22 | 0 | 0 | 0 | 14 | Hsekp | Per | own |
| 7/28/96 | inpt | upkp | $147 | D | Lan | LSD | N | Act | E3 | QM | M | 21 | 0 | 0 | 0 | - | Wtch | Per | own |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/30/96 | inpt | upkp | $460 | C | Pac | CG | N | Act | E5 | EM | M | 28 | 0 | 0 | 1 | 60 | T/S | Per | Tag |
| 7/30/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E4 | ET | M | 23 | 0 | 0 | 0 | 48 | Maint | Per | own |
| 8/1/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | AT | M | 24 | 0 | 0 | 0 | 48 | T/S | Per | own |
| 8/1/96 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | EM | M | 23 | 0 | 0 | 0 | 30 | Maint | Per | own |
| 8/1/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E6 | HM | M | 34 | 0 | 0 | 0 | 10 | Maint | Per | own |
| 8/5/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E3 | EM | M | 25 | 0 | 0 | 0 | 14 | PMS | Per | PPE |
| 8/8/96 | yard | upkp | $147 | D | Lan | DD | N | Act | E6 | ET | M | 35 | 0 | 0 | 0 | 60 | Maint | Per | oth |
| 8/8/96 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E5 | EM | M | 31 | 0 | 0 | 0 | 8 | PMS | Per | oth |
| 8/8/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | IC | M | 25 | 0 | 0 | 0 | 4 | T/S | Per | Tag |
| 8/8/96 | inpt | upkp | $147 | D | Pac | AS | N | Act | E5 | ET | M | 27 | 0 | 0 | 0 | 144 | Maint | Per | oth |
| 8/8/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AT | M | 21 | 0 | 0 | 0 | 36 | T/S | Per | oth |
| 8/12/96 | inpt | upkp | $147 | D | Pac | AE | N | Act | E4 | QM | M | 24 | 0 | 0 | 0 | 26 | Maint | Per | oth |
| 8/12/96 | inpt | upkp | $147 | D | Pac | AE | N | Act | E4 | ET | M | 21 | 0 | 0 | 0 | 9 | T/S | Per | PPE |
| 8/12/96 | anch | upkp | $147 | D | Pac | LHA | N | Act | E5 | ET | M | 27 | 0 | 0 | 0 | 66 | T/S | Per | PPE |
| 8/12/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E2 | EM | M | 20 | 0 | 0 | 0 | - | Weld | Per | PPE |
| 8/12/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E5 | GSE | M | 23 | 0 | 0 | 0 | 36 | PMS | Mat | n/a |
| 8/12/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | AT | M | 30 | 0 | 0 | 0 | 21 | Maint | Mat | n/a |
| 8/14/96 | inpt | upkp | $1,380 | C | Pac | FFG | N | Act | E7 | SK | M | 35 | 0 | 2 | 2 | 192 | Wtch | Per | own |
| 8/17/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 8/21/96 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E3 | OS | M | 20 | 0 | 0 | 0 | 2 | Wtch | Mat | n/a |
| 8/21/96 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E4 | OS | M | 22 | 0 | 0 | 0 | 42 | Wtch | Per | own |
| 8/21/96 | yard | ovhl | $147 | D | Lan | DDG | N | Act | O3 | LT | M | 24 | 0 | 0 | 0 | 24 | Wtch | Per | oth |
| 8/22/96 | anch | upkp | $147 | D | Lan | LSD | N | Act | E6 | MS | M | - | 0 | 0 | 0 | 0 | Hsekp | Per | oth |
| 8/22/96 | yard | ovhl | $147 | D | Lan | DDG | N | Act | E4 | STG | M | 23 | 0 | 0 | 0 | 10 | Hsekp | Per | oth |
| 8/23/96 | inpt | upkp | $147 | D | Pac | CGN | N | Act | E2 | QM | M | 20 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 8/23/96 | u/w | ISE | $147 | D | Lan | AS | N | Act | E3 | SN | M | 20 | 0 | 0 | 0 | 23 | Wtch | Per | oth |
| 8/28/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | EM | M | 24 | 0 | 0 | 0 | 13 | PMS | Per | PPE |
| 8/28/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E2 | AE | M | 23 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 8/28/96 | u/w | ISE | $147 | D | Lan | AS | N | Act | E3 | BM | M | 23 | 0 | 0 | 0 | 22 | Wtch | Per | oth |
| 8/29/96 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E3 | BM | M | 25 | 0 | 0 | 0 | 24 | Rehab | Per | Tag |
| 9/1/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E3 | AS | M | 22 | 0 | 0 | 0 | 8 | PMS | Per | PPE |
| 9/2/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E6 | MM | M | 27 | 0 | 0 | 0 | 12 | Hsekp | Per | own |
| 9/3/96 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | 32 | Maint | Per | PPE |
| 9/9/96 | inpt | upkp | $147 | D | Pac | LHA | N | Act | E9 | DC | M | 36 | 0 | 0 | 0 | 216 | Maint | Per | own |
| 9/9/96 | inpt | upkp | $147 | D | Lan | LPH | N | Act | E6 | AMS | M | 41 | 0 | 0 | 0 | 120 | Weld | Per | own |
| 9/10/96 | drydk | upkp | $147 | D | Lan | DD | N | Act | E5 | HT | M | 22 | 0 | 0 | 0 | 46 | Weld | Per | PPE |
| 9/11/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | AE | M | 29 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 9/11/96 | drydk | upkp | $147 | D | Lan | DD | N | Act | E3 | MS | M | 19 | 0 | 0 | 0 | 1 | Grind | Per | own |
| 9/12/96 | inpt | upkp | $147 | D | Pac | LHA | N | Act | E5 | BM | M | 27 | 0 | 0 | 0 | - | Maint | Per | PPE |
| 9/13/96 | inpt | upkp | $147 | D | Pac | CGN | N | Act | E4 | RM | M | 24 | 0 | 0 | 0 | 48 | Wtch | Mat | n/a |
| 9/13/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | IC | M | 26 | 0 | 0 | 0 | 18 | DC | Per | own |
| 9/13/96 | u/w | ISE | $147 | D | Pac | LHD | N | Act | E3 | HT | M | 23 | 0 | 0 | 0 | 32 | Weld | Per | PPE |
| 9/16/96 | u/w | ISE | $147 | D | Lan | DDG | N | Act | E3 | MS | M | 21 | 0 | 0 | 0 | 16 | Fdprp | Per | own |
| 9/17/96 | inpt | upkp | $230 | D | Lan | AO | N | Act | E4 | EM | F | 23 | 0 | 1 | 0 | 36 | T/S | Per | oth |
| 9/17/96 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E4 | BM | M | 23 | 0 | 0 | 0 | 12 | PMS | unk | n/a |
| 9/22/96 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E4 | BM | M | 23 | 0 | 0 | 0 | 42 | Maint | Per | oth |
| 9/23/96 | inpt | upkp | $1,031 | C | Pac | LHA | N | Act | E4 | MM | M | 22 | 1 | 0 | 1 | 48 | Maint | Per | PPE |
| 9/23/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | 15 | T/S | Per | PPE |
| 9/23/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E3 | MM | F | 27 | 0 | 0 | 0 | 24 | PMS | Per | own |
| 9/24/96 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | 15 | Wtch | Mat | n/a |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/25/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E2 | AO | M | 19 | 0 | 0 | 0 | 9 | Hsekp | Per | Tag |
| 9/25/96 | u/w | ISE | $147 | D | Lan | LCC | N | Act | E3 | HT | M | 20 | 0 | 0 | 0 | 6 | Weld | Per | PPE |
| 9/25/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E2 | AO | M | 19 | 0 | 0 | 0 | 6 | T/S | Per | Tag |
| 9/26/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | EM | M | 27 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 9/26/96 | inpt | upkp | $147 | D | Pac | LHA | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | 1 | Hsekp | Per | own |
| 9/29/96 | yard | upkp | $147 | D | Lan | DD | N | Act | E2 | RM | M | 21 | 0 | 0 | 0 | 40 | Wtch | Per | oth |
| 9/30/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E4 | GSM | M | 25 | 0 | 0 | 0 | 12 | PMS | Per | oth |
| 10/1/96 | drydk | conv | $147 | D | Lan | CVN | N | Act | E6 | ABF | M | 37 | 0 | 0 | 0 | 232 | Maint | Per | own |
| 10/1/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E5 | AS | M | 24 | 0 | 0 | 0 | 82 | T/S | Per | own |
| 10/4/96 | yard | ovhl | $690 | C | Pac | CVN | N | Act | E5 | DS | M | 25 | 0 | 1 | 1 | 42 | Maint | Per | own |
| 10/5/96 | u/w | ISE | $147 | D | Pac | LPD | N | Act | E4 | OS | M | - | 0 | 0 | 0 | 12 | Maint | Per | Tag |
| 10/5/96 | u/w | ISE | $147 | D | Pac | LPD | N | Act | E3 | OS | M | - | 0 | 0 | 0 | 18 | Maint | Per | Tag |
| 10/7/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | EM | F | 21 | 0 | 0 | 0 | 23 | Wtch | Mat | n/a |
| 10/8/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E5 | AO | M | 30 | 0 | 0 | 0 | 2 | Weld | Per | own |
| 10/8/96 | inpt | upkp | $147 | D | Lan | AE | N | Act | E5 | BM | M | 27 | 0 | 0 | 0 | 18 | Wtch | unk | n/a |
| 10/9/96 | yard | ovhl | $147 | D | Lan | CG | N | Act | E4 | EW | M | 21 | 0 | 0 | 0 | 36 | Hsekp | Per | own |
| 10/12/96 | u/w | ISE | $147 | D | Lan | AOE | N | Act | E4 | MS | M | 23 | 0 | 0 | 0 | 35 | Hsekp | Per | own |
| 10/14/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E2 | AA | M | 21 | 0 | 0 | 0 | 6 | Wtch | Per | oth |
| 10/14/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E5 | AT | M | 25 | 0 | 0 | 0 | 30 | Maint | Per | own |
| 10/16/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E3 | SM | M | 21 | 0 | 0 | 0 | 15 | Hsekp | Per | own |
| 10/21/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E2 | AA | M | 19 | 0 | 0 | 0 | 6 | Wtch | Per | own |
| 10/21/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | AT | M | 26 | 0 | 0 | 0 | 16 | T/S | Per | own |
| 10/22/96 | inpt | upkp | $147 | D | Lan | CG | N | Act | E7 | BM | M | 36 | 0 | 0 | 0 | 120 | Wtch | Per | oth |
| 10/22/96 | u/w | flops | $147 | D | Pac | CG | N | Act | O3 | LT | M | 31 | 0 | 0 | 0 | 42 | Wtch | Mat | n/a |
| 10/23/96 | u/w | ISE | $147 | D | Lan | DDG | N | Act | E3 | GMM | M | 22 | 0 | 0 | 0 | 7 | Maint | Per | own |
| 10/23/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | AS | M | 21 | 0 | 0 | 0 | 5 | Maint | Per | Tag |
| 10/24/96 | inpt | upkp | $147 | D | Pac | DD | N | Act | E3 | FN | M | 19 | 0 | 0 | 0 | 24 | PMS | Per | Tag |
| 10/25/96 | u/w | flops | $147 | D | Pac | CG | N | Act | E6 | EN | M | 39 | 0 | 0 | 0 | 42 | Wtch | Mat | n/a |
| 10/25/96 | yard | ovhl | $147 | D | Lan | DDG | N | Act | E5 | FC | M | 33 | 0 | 0 | 0 | 84 | Hsekp | Per | own |
| 10/25/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E3 | AN | M | 24 | 0 | 0 | 0 | 18 | Wtch | Mat | n/a |
| 10/25/96 | yard | upkp | $147 | D | Pac | DDG | N | Act | E4 | GMM | F | 20 | 0 | 0 | 0 | 9 | Maint | Per | Tag |
| 10/25/96 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E6 | HT | M | - | 0 | 0 | 0 | 120 | Weld | Per | PPE |
| 10/26/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | EM | M | 19 | 0 | 0 | 0 | 4 | Maint | Per | own |
| 10/28/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E8 | GS | M | 35 | 0 | 0 | 0 | 120 | Maint | Per | own |
| 10/28/96 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E5 | HT | M | 30 | 0 | 0 | 0 | 120 | Weld | Per | PPE |
| 10/29/96 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | EM | M | 20 | 0 | 0 | 0 | 5 | Maint | Per | oth |
| 10/30/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E5 | AT | M | 29 | 0 | 0 | 0 | 72 | Maint | Per | own |
| 10/30/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | MS | M | 21 | 0 | 0 | 0 | 4 | T/S | Per | own |
| 10/31/96 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E5 | FC | M | 27 | 0 | 0 | 0 | 12 | T/S | Per | oth |
| 11/1/96 | inpt | upkp | $147 | D | Lan | DD | N | Act | E3 | SN | M | 24 | 0 | 0 | 0 | - | Wtch | Per | own |
| 11/4/96 | u/w | ISE | $147 | D | Pac | AOE | N | Act | E5 | EM | M | 26 | 0 | 0 | 0 | 25 | T/S | Per | Tag |
| 11/4/96 | anch | upkp | $1,380 | C | Lan | FFG | N | Act | E2 | RM | M | 21 | 0 | 2 | 2 | 9 | Maint | unk | n/a |
| 11/6/96 | inpt | upkp | $460 | C | Lan | CG | N | Act | E4 | SM | M | 22 | 0 | 0 | 1 | 24 | Wtch | Per | oth |
| 11/6/96 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | MR | M | 19 | 0 | 0 | 0 | 11 | Maint | Per | own |
| 11/9/96 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E4 | EM | M | 24 | 0 | 0 | 0 | 36 | PMS | Per | Tag |
| 11/12/96 | yard | ovhl | $147 | D | Pac | CVN | N | Act | E5 | DC | M | 30 | 0 | 0 | 0 | 96 | DC | Per | PPE |
| 11/13/96 | inpt | upkp | $147 | D | Pac | LPH | N | Act | E3 | EM | M | 22 | 0 | 0 | 0 | 21 | Maint | Per | Tag |
| 11/15/96 | inpt | upkp | $147 | D | Lan | DDG | N | Act | E5 | FC | M | 25 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 11/16/96 | u/w | flops | $147 | D | Lan | CV | N | Act | E3 | AN | M | 21 | 0 | 0 | 0 | 10 | Wtch | Per | own |
| 11/18/96 | inpt | upkp | $147 | D | Lan | LSD | N | Act | E3 | FN | M | 27 | 0 | 0 | 0 | 16 | T/S | Per | Tag |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/19/96 | inpt | upkp | $147 | D | Lan | ARS | N | Act | E3 | EN | M | 21 | 0 | 0 | 0 | 6 | Maint | Per | oth |
| 11/19/96 | u/w | ISE | $690 | C | Lan | CG | N | Act | E4 | TM | M | 20 | 0 | 1 | 1 | 2 | Hsekp | Per | Tag |
| 11/20/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | MM | M | 23 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 11/22/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | EM | M | 23 | 0 | 0 | 0 | 25 | T/S | Per | PPE |
| 11/23/96 | u/w | flops | $147 | D | Lan | CVN | N | Act | E5 | AMH | M | 26 | 0 | 0 | 0 | 6 | Wtch | unk | n/a |
| 11/25/96 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E4 | EN | M | 25 | 0 | 0 | 0 | 7 | Wtch | Per | oth |
| 11/25/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | HT | M | 22 | 0 | 0 | 0 | 24 | Maint | Per | oth |
| 11/28/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E2 | AA | M | 26 | 0 | 0 | 0 | 1 | Dishes | Per | oth |
| 11/28/96 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | HT | M | 25 | 0 | 0 | 0 | 54 | Weld | Per | PPE |
| 12/3/96 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | RM | M | 25 | 0 | 0 | 0 | - | Wtch | Per | PPE |
| 12/4/96 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | MM | M | 22 | 0 | 0 | 0 | - | Wtch | Per | own |
| 12/5/96 | inpt | upkp | $147 | D | Pac | CV | N | Act | E1 | AO | M | 19 | 0 | 0 | 0 | 3 | Wtch | Per | own |
| 12/8/96 | inpt | upkp | $147 | D | Pac | DD | N | Act | E3 | SN | M | 24 | 0 | 0 | 0 | 16 | Maint | Per | Tag |
| 12/9/96 | inpt | upkp | $147 | D | Pac | DD | N | Act | E7 | OS | M | 38 | 0 | 0 | 0 | 240 | Wtch | Per | Tag |
| 12/15/96 | inpt | upkp | $147 | D | Pac | CG | N | Act | E3 | SN | M | 21 | 0 | 0 | 0 | 18 | Wtch | Mat | n/a |
| 12/19/96 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E2 | EM | M | - | 0 | 0 | 0 | 1 | PMS | Per | Tag |
| 12/20/96 | inpt | upkp | $147 | D | Pac | LPD | N | TAR | O1 | ENS | M | 27 | 0 | 0 | 0 | 6 | Inspt | Per | PPE |
| 12/20/96 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | EM | M | 21 | 0 | 0 | 0 | 36 | T/S | Per | Tag |
| 1/2/97 | inpt | upkp | $147 | D | Pac | CV | N | Act | E3 | MS | M | 21 | 0 | 0 | 0 | 4 | T/S | Per | own |
| 1/2/97 | inpt | ISE | $147 | D | Lan | DD | N | Act | E4 | SK | M | 23 | 0 | 0 | 0 | 31 | Hsekp | Per | own |
| 1/3/97 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E2 | GSE | M | 20 | 0 | 0 | 0 | 2 | PMS | Per | both |
| 1/4/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E4 | MS | F | 21 | 0 | 0 | 0 | 42 | Fdprp | Mat | n/a |
| 1/5/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E3 | MS | M | 21 | 0 | 0 | 0 | 11 | Fdprp | Per | own |
| 1/6/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | MM | M | 22 | 0 | 0 | 0 | 3 | Hsekp | Per | own |
| 1/8/97 | inpt | upkp | $460 | C | Lan | FFG | N | Act | E4 | MS | M | 23 | 0 | 0 | 1 | 11 | Fdprp | Unk | n/a |
| 1/8/97 | yard | ovhl | $147 | D | Lan | FFG | N | Act | E4 | GSE | M | 21 | 0 | 0 | 0 | 32 | PMS | Per | own |
| 1/11/97 | u/w | ISE | $147 | D | Pac | LCC | N | Act | E4 | HT | M | 27 | 0 | 0 | 0 | 36 | Weld | Per | PPE |
| 1/13/97 | yard | ovhl | $147 | D | Lan | LSD | N | Act | E4 | RM | M | 23 | 0 | 0 | 0 | 1 | Rehab | Per | Tag |
| 1/13/97 | inpt | upkp | $147 | D | Pac | CVN | N | Act | E5 | AO | M | 24 | 0 | 0 | 0 | 53 | PMS | Per | own |
| 1/13/97 | drydk | ovhl | $147 | D | Pac | LHA | N | Act | E2 | FA | M | 20 | 0 | 0 | 0 | 7 | Wtch | Per | Tag |
| 1/13/97 | u/w | ISE | $147 | D | Lan | MCS | N | Act | E4 | AT | M | 24 | 0 | 0 | 0 | 8 | Maint | Per | own |
| 1/14/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E3 | RM | M | 20 | 0 | 0 | 0 | 5 | Wtch | Per | oth |
| 1/18/97 | u/w | ISE | $147 | D | Lan | DD | N | Act | E4 | SH | M | 25 | 0 | 0 | 0 | 32 | Lndry | Per | Tag |
| 1/19/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | E5 | AT | M | 23 | 0 | 0 | 0 | 48 | T/S | Per | own |
| 1/22/97 | inpt | upkp | $147 | D | Lan | PC | N | Act | E5 | GMG | M | 27 | 0 | 0 | 0 | 36 | PMS | Mat | n/a |
| 1/23/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E1 | FR | M | 19 | 0 | 0 | 0 | 1 | T/S | Per | Tag |
| 1/24/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E2 | AT | M | 20 | 0 | 0 | 0 | 15 | Hsekp | Per | oth |
| 1/24/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | ABH | M | 25 | 0 | 0 | 0 | - | Hsekp | Per | own |
| 1/24/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E5 | ABH | M | 21 | 0 | 0 | 0 | - | T/S | Per | own |
| 1/24/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E5 | ABH | M | 25 | 0 | 0 | 0 | - | T/S | Per | own |
| 1/24/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E3 | EM | M | 20 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 1/24/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E5 | DC | M | 25 | 0 | 0 | 0 | 60 | Maint | Per | PPE |
| 1/27/97 | inpt | upkp | $147 | D | Lan | CG | N | Act | O3 | LT | M | 37 | 0 | 0 | 0 | - | Wtch | Per | oth |
| 1/27/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E4 | BT | M | 23 | 0 | 0 | 0 | 144 | Maint | Per | both |
| 1/30/97 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E4 | EM | M | 26 | 0 | 0 | 0 | 30 | Maint | Per | oth |
| 1/31/97 | u/w | ISE | $147 | D | Pac | FFG | N | Act | O2 | LTjg | M | 31 | 0 | 0 | 0 | - | T/S | Per | PPE |
| 1/31/97 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E5 | GSM | M | 29 | 0 | 0 | 0 | 7 | T/S | Per | PPE |
| 2/3/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | E2 | SA | M | 21 | 0 | 0 | 0 | 4 | Weld | Per | oth |
| 2/3/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | HT | M | 22 | 0 | 0 | 0 | 12 | Weld | Per | PPE |
| 2/4/97 | u/w | ISE | $230 | D | Pac | CVN | N | Act | E5 | OS | M | 23 | 0 | 1 | 0 | 2 | Wtch | Per | oth |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/5/97 | u/w | ISE | $147 | D | Pac | AE | N | Act | E2 | RM | F | 20 | 0 | 0 | 0 | 5 | PMS | Per | oth |
| 2/6/97 | inpt | upkp | $147 | D | Lan | AOE | N | Act | E3 | IC | M | 22 | 0 | 0 | 0 | 33 | Maint | Per | PPE |
| 2/6/97 | inpt | upkp | $147 | D | Pac | CG | N | Act | E6 | FC | M | 34 | 0 | 0 | 0 | - | Hsekp | Per | own |
| 2/7/97 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E5 | IC | M | 30 | 0 | 0 | 0 | 84 | T/S | Per | Tag |
| 2/11/97 | u/w | ISE | $147 | D | Pac | AO | N | Act | E5 | MM | M | 40 | 0 | 0 | 0 | 6 | Wtch | Per | oth |
| 2/12/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E5 | MM | M | 31 | 0 | 0 | 0 | 6 | T/S | Mat | n/a |
| 2/13/97 | inpt | upkp | $147 | D | Lan | AGF | N | Act | E2 | MM | M | 19 | 0 | 0 | 0 | 5 | PMS | Per | Tag |
| 2/14/97 | inpt | upkp | $147 | D | Pac | DDG | N | Act | O3 | LT | M | 30 | 0 | 0 | 0 | - | Inspt | Per | PPE |
| 2/15/97 | yard | ovhl | $147 | D | Lan | DD | N | Act | E2 | FA | M | 19 | 0 | 0 | 0 | 11 | Rehab | Per | PPE |
| 2/18/97 | inpt | upkp | $147 | D | Pac | AO | N | Act | E4 | IC | M | 24 | 0 | 0 | 0 | 15 | Maint | Per | PPE |
| 2/20/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E4 | OS | M | 24 | 0 | 0 | 0 | 33 | PMS | Per | Tag |
| 2/20/97 | yard | ovhl | $147 | D | Lan | CG | N | Act | E2 | FA | M | 19 | 0 | 0 | 0 | 9 | Maint | Per | oth |
| 2/20/97 | inpt | upkp | $147 | D | Lan | LSD | N | Act | E4 | HT | M | 21 | 0 | 0 | 0 | 24 | Weld | Per | PPE |
| 2/20/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | WO2 | CWO | M | 34 | 0 | 0 | 0 | 72 | Inspt | Per | oth |
| 2/21/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | O3 | LT | M | 33 | 0 | 0 | 0 | 23 | Inspt | Per | PPE |
| 2/22/97 | inpt | upkp | $147 | D | Lan | CG | N | Act | O4 | LCDR | M | 33 | 0 | 0 | 0 | 15 | Wtch | Per | oth |
| 2/22/97 | u/w | ISE | $147 | D | Pac | AS | N | Act | E5 | OM | M | 40 | 0 | 0 | 0 | 180 | Train | Mat | n/a |
| 2/23/97 | yard | upkp | $147 | D | Pac | CGN | N | Act | E7 | HT | M | 32 | 0 | 0 | 0 | 168 | DC | Per | own |
| 2/23/97 | yard | upkp | $147 | D | Pac | CGN | N | Act | E6 | MM | M | 29 | 0 | 0 | 0 | 60 | DC | Per | own |
| 2/24/97 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | DK | M | 36 | 0 | 0 | 0 | 156 | Maint | Per | both |
| 2/24/97 | u/w | ISE | $147 | D | Pac | DD | N | Act | O2 | LTjg | M | 26 | 0 | 0 | 0 | 1 | Wtch | Per | own |
| 2/24/97 | u/w | ISE | $147 | D | Pac | CG | N | Act | E5 | EN | M | 25 | 0 | 0 | 0 | 36 | Maint | Mat | n/a |
| 2/24/97 | u/w | ISE | $147 | D | Pac | DD | N | Act | E4 | DC | M | 21 | 0 | 0 | 0 | 36 | Wtch | Per | own |
| 2/25/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | E2 | AK | M | 21 | 0 | 0 | 0 | - | Wtch | Per | own |
| 2/26/97 | yard | ovhl | $460 | C | Lan | DD | N | Act | E3 | GMG | M | 19 | 0 | 0 | 1 | 1 | Hsekp | Per | Tag |
| 2/26/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E6 | TM | M | 35 | 0 | 0 | 0 | 72 | T/S | Per | own |
| 2/28/97 | yard | ovhl | $147 | D | Pac | AOE | N | Act | E5 | EM | M | 25 | 0 | 0 | 0 | 48 | PMS | Per | Tag |
| 2/28/97 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E4 | EM | M | 20 | 0 | 0 | 0 | 12 | Maint | Per | both |
| 3/1/97 | u/w | s/a | $147 | D | Pac | DD | N | Act | E5 | BM | M | 26 | 0 | 0 | 0 | 60 | Wtch | Per | oth |
| 3/3/97 | u/w | ISE | $147 | D | Lan | CG | N | Act | E3 | SH | M | 21 | 0 | 0 | 0 | 5 | Maint | Per | own |
| 3/3/97 | inpt | s/a | $147 | D | Lan | LPD | N | Act | E3 | SN | M | 22 | 0 | 0 | 0 | 24 | Wtch | Per | own |
| 3/3/97 | inpt | upkp | $147 | D | Lan | LCC | N | Act | E5 | DS | M | 24 | 0 | 0 | 0 | 60 | Maint | Per | oth |
| 3/3/97 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E3 | MS | M | 21 | 0 | 0 | 0 | 24 | Rehab | Per | oth |
| 3/5/97 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E3 | MS | F | 23 | 0 | 0 | 0 | 3 | Hsekp | Mat | n/a |
| 3/7/97 | inpt | upkp | $147 | D | Lan | CG | N | Act | E4 | FC | M | 24 | 0 | 0 | 0 | 26 | PMS | unk | n/a |
| 3/9/97 | u/w | flops | $147 | D | Lan | CV | N | Act | E4 | AE | M | 23 | 0 | 0 | 0 | 12 | Maint | Per | Tag |
| 3/11/97 | yard | ovhl | $147 | D | Lan | FFG | N | Act | O1 | ENS | M | 22 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 3/12/97 | drydk | upkp | $460 | C | Lan | AFDM | N | Act | E4 | HT | M | 24 | 0 | 0 | 1 | 36 | Weld | Per | PPE |
| 3/12/97 | yard | upkp | $147 | D | Pac | CGN | N | Act | E4 | GMG | M | 23 | 0 | 0 | 0 | 48 | Maint | Per | own |
| 3/12/97 | yard | ovhl | $147 | D | Lan | FFG | N | Act | E4 | GSE | M | 28 | 0 | 0 | 0 | 80 | Maint | Per | own |
| 3/13/97 | inpt | upkp | $2,062 | C | Lan | DDG | N | Act | E4 | RM | M | 23 | 2 | 0 | 2 | 36 | PMS | Per | both |
| 3/15/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | AN | M | 20 | 0 | 0 | 0 | - | Hsekp | Per | Tag |
| 3/16/97 | u/w | flops | $147 | D | Pac | DD | N | Act | O2 | LTjg | M | 31 | 0 | 0 | 0 | 2 | Wtch | Per | own |
| 3/17/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | AT | M | 20 | 0 | 0 | 0 | 18 | PMS | Per | PPE |
| 3/18/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E3 | HT | M | 20 | 0 | 0 | 0 | 12 | Weld | Per | own |
| 3/18/97 | u/w | ISE | $147 | D | Lan | DD | N | Act | E5 | QM | M | 27 | 0 | 0 | 0 | 42 | Wtch | unk | n/a |
| 3/18/97 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E4 | EN | M | - | 0 | 0 | 0 | 24 | Maint | Per | own |
| 3/19/97 | yard | upkp | $147 | D | Lan | CVN | N | Act | E3 | SK | M | 20 | 0 | 0 | 0 | 1 | Hsekp | Per | own |
| 3/19/97 | u/w | ISE | $147 | D | Pac | LHD | N | Act | E4 | ET | M | 24 | 0 | 0 | 0 | 24 | T/S | Per | own |
| 3/20/97 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E4 | ET | M | 21 | 0 | 0 | 0 | 10 | T/S | Per | own |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/26/97 | inpt | upkp | $147 | D | Lan | CG | N | Act | E4 | MS | M | 23 | 0 | 0 | 0 | 6 | Hsekp | Per | Tag |
| 3/26/97 | u/w | ISE | $147 | D | Pac | FFG | N | Act | E4 | TM | M | 21 | 0 | 0 | 0 | - | Hsekp | Per | Tag |
| 3/28/97 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E3 | GSE | M | 23 | 0 | 0 | 0 | 12 | PMS | Per | Tag |
| 3/31/97 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E4 | EN | M | 27 | 0 | 0 | 0 | 12 | Maint | Mat | n/a |
| 3/31/97 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E6 | DC | M | 38 | 0 | 0 | 0 | 48 | Train | Per | own |
| 4/1/97 | u/w | ISE | $147 | D | Pac | DD | N | Act | E4 | GMG | M | 21 | 0 | 0 | 0 | 30 | Maint | Per | PPE |
| 4/3/97 | inpt | upkp | $147 | D | Pac | CVN | N | Act | E5 | EM | M | 25 | 0 | 0 | 0 | 36 | Maint | Per | Tag |
| 4/4/97 | inpt | upkp | $147 | D | Pac | CVN | N | Act | E2 | MS | M | 20 | 0 | 0 | 0 | 20 | Maint | Mat | n/a |
| 4/4/97 | inpt | upkp | $1,031 | C | Pac | ARS | N | Act | E3 | EM | M | 21 | 1 | 0 | 1 | 16 | T/S | Per | PPE |
| 4/7/97 | u/w | ISE | $147 | D | Lan | MHC | N | Act | E7 | BM | M | 34 | 0 | 0 | 0 | 120 | Wtch | Mat | n/a |
| 4/7/97 | u/w | ISE | $147 | D | Lan | MHC | N | Act | E5 | BM | M | 22 | 0 | 0 | 0 | 48 | Wtch | Per | own |
| 4/7/97 | u/w | ISE | $147 | D | Lan | MHC | N | Act | E4 | EN | M | 20 | 0 | 0 | 0 | 7 | Wtch | Per | own |
| 4/8/97 | inpt | upkp | $147 | D | Lan | CGN | N | Act | E5 | EM | M | - | 0 | 0 | 0 | 28 | PMS | Per | Tag |
| 4/8/97 | inpt | upkp | $147 | D | Lan | CGN | N | Act | E4 | EM | M | - | 0 | 0 | 0 | 28 | PMS | Per | Tag |
| 4/8/97 | yard | ovhl | $147 | D | Lan | LPD | N | Act | E5 | HT | M | 30 | 0 | 0 | 0 | 120 | Grind | Mat | n/a |
| 4/9/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | SN | F | 20 | 0 | 0 | 0 | 12 | Hsekp | Per | oth |
| 4/9/97 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E4 | MM | M | 33 | 0 | 0 | 0 | - | Maint | Per | PPE |
| 4/10/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E3 | DC | F | 19 | 0 | 0 | 0 | 18 | Maint | Per | oth |
| 4/11/97 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E4 | MS | M | 30 | 0 | 0 | 0 | 24 | Hsekp | Per | both |
| 4/12/97 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E4 | FC | M | 21 | 0 | 0 | 0 | 6 | PMS | Per | own |
| 4/15/97 | yard | ovhl | $147 | D | Lan | LPD | N | Act | E3 | AB | M | 24 | 0 | 0 | 0 | 1 | Rehab | Per | Tag |
| 4/15/97 | u/w | ISE | $147 | D | Lan | DDG | N | Act | E4 | HT | M | 23 | 0 | 0 | 0 | 43 | PMS | Per | PPE |
| 4/16/97 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | ET | M | 24 | 0 | 0 | 0 | 42 | PMS | Per | PPE |
| 4/16/97 | u/w | ISE | $230 | D | Lan | FFG | N | Act | E5 | BM | M | 39 | 0 | 1 | 0 | 3 | Maint | Per | PPE |
| 4/16/97 | u/w | ISE | $147 | D | Pac | DD | N | Act | O4 | LCDR | M | 36 | 0 | 0 | 0 | 5 | Wtch | Per | oth |
| 4/17/97 | inpt | upkp | $147 | D | Pac | LST | N | Act | E3 | RM | M | 22 | 0 | 0 | 0 | [illegible] | PMS | Per | both |
| 4/17/97 | u/w | ISE | $147 | D | Lan | MCS | N | Act | E4 | MM | M | 23 | 0 | 0 | 0 | 30 | Wtch | Mat | n/a |
| 4/18/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E6 | DC | M | 37 | 0 | 0 | 0 | 5 | Wtch | Per | own |
| 4/26/97 | u/w | flops | $147 | D | Pac | CVN | N | Act | E4 | AD | M | 21 | 0 | 0 | 0 | 18 | Wtch | Per | own |
| 4/26/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AD | M | 31 | 0 | 0 | 0 | 32 | Maint | Per | Tag |
| 4/28/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | MR | M | 23 | 0 | 0 | 0 | 48 | PMS | unk | n/a |
| 4/28/97 | inpt | upkp | $147 | D | Lan | PC | N | Act | E6 | EM | M | 36 | 0 | 0 | 0 | - | Maint | Per | Tag |
| 5/1/97 | u/w | ISE | $147 | D | Lan | AFS | N | Act | E4 | RM | M | 23 | 0 | 0 | 0 | 10 | Train | Per | own |
| 5/2/97 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E4 | ET | M | 21 | 0 | 0 | 0 | 16 | PMS | Per | own |
| 5/4/97 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E6 | MS | M | 45 | 0 | 0 | 0 | 264 | Hsekp | Per | oth |
| 5/5/97 | inpt | upkp | $920 | C | Pac | DD | N | Act | E6 | DS | M | 35 | 0 | 0 | 2 | - | Hsekp | Per | own |
| 5/5/97 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | 3 | Maint | Per | PPE |
| 5/5/97 | u/w | flops | $147 | D | Lan | CV | N | Act | E3 | AMS | M | 21 | 0 | 0 | 0 | 12 | Wtch | Per | own |
| 5/9/97 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E6 | EM | M | 31 | 0 | 0 | 0 | 120 | T/S | Per | both |
| 5/9/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E3 | TM | M | 19 | 0 | 0 | 0 | 12 | PMS | Mat | n/a |
| 5/9/97 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E4 | AD | M | 22 | 0 | 0 | 0 | 18 | Maint | Per | own |
| 5/10/97 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E6 | EN | M | 32 | 0 | 0 | 0 | - | Inspt | Per | Tag |
| 5/16/97 | inpt | upkp | $147 | D | Pac | DD | N | Act | E6 | EN | M | 39 | 0 | 0 | 0 | - | PMS | Per | PPE |
| 5/16/97 | u/w | unrep | $10,691 | C | Lan | AE | N | Act | E4 | GMG | M | 24 | 1 | 0 | 22 | 42 | Wtch | Per | own |
| 5/17/97 | u/w | ISE | $141,024 | B | Pac | DD | N | Act | E4 | MS | M | 22 | 0 | 0 | PPD | 27 | Fdprp | Per | both |
| 5/20/97 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E5 | GSM | M | 28 | 0 | 0 | 0 | 10 | T/S | Per | PPE |
| 5/20/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | EM | M | 23 | 0 | 0 | 0 | 36 | Maint | Per | PPE |
| 5/20/97 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E5 | HT | M | 44 | 0 | 0 | 0 | 18 | Wtch | Per | own |
| 5/21/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E5 | AT | M | 29 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 5/21/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E4 | MM | F | 21 | 0 | 0 | 0 | 180 | Maint | Per | own |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/22/97 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E7 | MM | M | 36 | 0 | 0 | 0 | - | Wtch | Mat | n/a |
| 5/23/97 | u/w | ISE | $147 | D | Lan | CG | N | Act | E1 | SR | M | - | 0 | 0 | 0 | 1 | Wtch | Per | Tag |
| 5/23/97 | u/w | ISE | $460 | B | Lan | MHC | N | Act | E3 | SN | M | 25 | 0 | 0 | 1 | - | Wtch | Envr | n/a |
| 5/23/97 | u/w | ISE | $460 | B | Lan | MHC | N | Act | E2 | SA | M | 21 | 0 | 0 | 1 | - | Wtch | Envr | n/a |
| 5/23/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 5/28/97 | u/w | flops | $147 | D | Pac | CGN | N | Act | E5 | AE | M | 22 | 0 | 0 | 0 | 8 | Wtch | Mat | n/a |
| 5/30/97 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E4 | SM | M | 21 | 0 | 0 | 0 | 24 | PMS | Per | own |
| 5/31/97 | inpt | upkp | $230 | D | Lan | CG | N | Act | E4 | ET | M | 22 | 0 | 1 | 0 | 6 | T/S | Per | both |
| 6/1/97 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E6 | EN | M | 31 | 0 | 0 | 0 | 153 | T/S | Per | Tag |
| 6/2/97 | yard | ovhl | $147 | D | Lan | DD | N | Act | E2 | OS | M | 23 | 0 | 0 | 0 | 6 | Hsekp | Per | own |
| 6/3/97 | u/w | flops | $147 | D | Lan | MCS | N | Act | O3 | LT | M | 28 | 0 | 0 | 0 | - | Wtch | unk | n/a |
| 6/5/97 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E6 | MM | M | 28 | 0 | 0 | 0 | - | Maint | Per | own |
| 6/5/97 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E2 | EM | M | 21 | 0 | 0 | 0 | 13 | PMS | Per | Tag |
| 6/5/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | E5 | AT | M | 28 | 0 | 0 | 0 | 96 | T/S | Per | own |
| 6/5/97 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E3 | EM | M | 21 | 0 | 0 | 0 | 1 | Dishes | Per | oth |
| 6/7/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | AT | M | 21 | 0 | 0 | 0 | 48 | Maint | Mat | n/a |
| 6/8/97 | inpt | upkp | $147 | D | Lan | LCC | N | Act | E5 | EM | F | 25 | 0 | 0 | 0 | - | PMS | Per | both |
| 6/9/97 | yard | ovhl | $147 | D | Lan | LPD | N | Act | E5 | QM | M | 27 | 0 | 0 | 0 | 6 | Grind | Per | own |
| 6/10/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | E6 | HT | M | 35 | 0 | 0 | 0 | 120 | Weld | Per | PPE |
| 6/10/97 | u/w | flops | $147 | D | Pac | LHA | N | Act | E6 | ABH | M | 31 | 0 | 0 | 0 | 126 | Wtch | Per | own |
| 6/12/97 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E1 | EM | M | 20 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 6/12/97 | yard | conv | $5,171 | C | Pac | DDG | N | Act | E4 | GMM | M | 19 | 1 | 14 | 3 | 1 | Hsekp | Per | Tag |
| 6/13/97 | yard | ovhl | $147 | D | Pac | CVN | N | Act | E3 | AE | M | 25 | 0 | 0 | 0 | 3 | Maint | Per | Tag |
| 6/16/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | AS | M | 27 | 0 | 0 | 0 | 72 | Maint | Per | both |
| 6/17/97 | yard | ovhl | $147 | D | Lan | MHC | N | Act | E3 | BM | M | 21 | 0 | 0 | 0 | 14 | Rehab | Per | oth |
| 6/17/97 | yard | ovhl | $147 | D | Lan | MHC | N | Act | E2 | SA | M | 19 | 0 | 0 | 0 | 3 | Rehab | Per | oth |
| 6/18/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | AE | M | 22 | 0 | 0 | 0 | 36 | PMS | Mat | n/a |
| 6/18/97 | inpt | upkp | $147 | D | Lan | DD | N | Res | E4 | MM | F | 27 | 0 | 0 | 0 | 108 | Maint | Per | Tag |
| 6/18/97 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E3 | GSE | M | 20 | 0 | 0 | 0 | 4 | Maint | Per | Tag |
| 6/18/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | BM | M | 21 | 0 | 0 | 0 | 24 | T/S | Per | both |
| 6/18/97 | u/w | flops | $147 | D | Lan | CV | N | Act | E3 | AMH | M | 21 | 0 | 0 | 0 | 20 | Wtch | Per | own |
| 6/19/97 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E4 | SM | M | 27 | 0 | 0 | 0 | 22 | Wtch | Per | oth |
| 6/19/97 | u/w | ISE | $147 | D | Lan | LSD | N | Act | E3 | HT | M | 21 | 0 | 0 | 0 | 36 | Weld | Per | own |
| 6/19/97 | yard | ovhl | $147 | D | Lan | CVN | N | Act | E4 | AO | M | 24 | 0 | 0 | 0 | 14 | Maint | Per | own |
| 6/20/97 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E7 | EN | M | 31 | 0 | 0 | 0 | 22 | Wtch | Mat | n/a |
| 6/22/97 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E4 | EN | M | 28 | 0 | 0 | 0 | 14 | PMS | Per | own |
| 6/24/97 | u/w | flops | $147 | D | Lan | CVN | N | Act | E5 | AE | M | 26 | 0 | 0 | 0 | 10 | PMS | Per | own |
| 6/24/97 | u/w | ISE | $147 | D | Pac | LPD | N | Act | E3 | DC | M | 21 | 0 | 0 | 0 | 13 | Hsekp | Per | own |
| 6/24/97 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E4 | GSM | M | 22 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 6/24/97 | anch | upkp | $147 | D | Pac | LHD | N | Act | E5 | MR | M | 33 | 0 | 0 | 0 | 156 | Maint | Mat | n/a |
| 6/25/97 | inpt | upkp | $147 | D | Pac | CV | N | Act | E2 | RM | M | 21 | 0 | 0 | 0 | - | Rehab | Per | oth |
| 6/25/97 | u/w | ISE | $147 | D | Lan | LSD | N | Act | E5 | HT | M | 31 | 0 | 0 | 0 | 6 | Inspt | Mat | n/a |
| 6/27/97 | inpt | upkp | $147 | D | Lan | MCM | N | Act | E2 | IC | M | 19 | 0 | 0 | 0 | 2 | T/S | Per | PPE |
| 6/27/97 | yard | ovhl | $147 | D | Pac | CVN | N | Act | E3 | AD | M | 21 | 0 | 0 | 0 | 4 | Rehab | Per | Tag |
| 6/29/97 | u/w | ISE | $147 | D | Pac | LSD | N | Act | E5 | RM | M | 35 | 0 | 0 | 0 | 6 | T/S | Per | own |
| 6/30/97 | yard | ovhl | $147 | D | Pac | CVN | N | Act | E4 | MM | M | 24 | 0 | 0 | 0 | 36 | Maint | Per | own |
| 6/30/97 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E4 | EN | M | 22 | 0 | 0 | 0 | 31 | T/S | Per | own |
| 6/30/97 | u/w | ISE | $147 | D | Pac | DDG | N | Act | O5 | CDR | M | 40 | 0 | 0 | 0 | 9 | Wtch | Mat | n/a |
| 7/1/97 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E4 | MM | M | 21 | 0 | 0 | 0 | 30 | Maint | Per | Tag |
| 7/1/97 | inpt | upkp | $147 | D | Pac | LHD | N | Act | E3 | AN | M | 19 | 0 | 0 | 0 | - | Hsekp | unk | n/a |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7/3/97 | inpt | upkp | $2,070 | C | Pac | LHA | N | Act | E5 | HT | M | 23 | 0 | 7 | 1 | 60 | Weld | Per | PPE |
| 7/3/97 | anch | upkp | $147 | D | Lan | DD | N | Act | E4 | RM | M | 25 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 7/4/97 | inpt | conv | $147 | D | Lan | LHD | N | Act | E6 | NC | M | 30 | 0 | 0 | 0 | 1 | PMS | Per | oth |
| 7/7/97 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E3 | RM | M | 20 | 0 | 0 | 0 | 13 | T/S | Per | own |
| 7/10/97 | u/w | ISE | $147 | D | Pac | LHD | N | Act | E6 | AT | M | 30 | 0 | 0 | 0 | 12 | T/S | Per | Tag |
| 7/11/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E5 | AS | M | 27 | 0 | 0 | 0 | 64 | PMS | Per | PPE |
| 7/12/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | O3 | LT | M | 30 | 0 | 0 | 0 | 96 | Wtch | Per | oth |
| 7/14/97 | inpt | s/a | $147 | D | Pac | CVN | N | Act | E4 | ET | M | 23 | 0 | 0 | 0 | - | T/S | Per | PPE |
| 7/17/97 | inpt | upkp | $460 | C | Lan | AS | N | Act | E1 | SR | M | 19 | 0 | 0 | 1 | 1 | Wtch | Mat | n/a |
| 7/19/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | E3 | AT | M | 22 | 0 | 0 | 0 | 9 | PMS | Per | own |
| 7/22/97 | inpt | upkp | $147 | D | Lan | AS | N | TAR | E4 | EM | M | 23 | 0 | 0 | 0 | 17 | PMS | Per | both |
| 7/22/97 | u/w | s/a | $147 | D | Pac | CG | N | Act | E3 | EM | M | 24 | 0 | 0 | 0 | 48 | Hsekp | Per | PPE |
| 7/24/97 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E2 | DC | M | 21 | 0 | 0 | 0 | 22 | PMS | Per | Tag |
| 7/25/97 | inpt | upkp | $147 | D | Pac | CVN | N | Act | E6 | EM | M | 33 | 0 | 0 | 0 | - | Maint | Per | own |
| 7/26/97 | yard | upkp | $147 | D | Pac | CVN | N | Act | E5 | ET | M | 23 | 0 | 0 | 0 | 18 | Maint | Per | Tag |
| 7/27/97 | inpt | conv | $147 | D | Lan | LHD | N | Act | E5 | MS | M | 34 | 0 | 0 | 0 | 108 | Inspt | Per | Tag |
| 7/27/97 | u/w | ISE | $147 | D | Lan | LPH | N | Act | E4 | AT | M | 24 | 0 | 0 | 0 | 19 | Train | Per | own |
| 7/29/97 | inpt | upkp | $147 | D | Lan | AGF | N | Act | E5 | EW | M | 23 | 0 | 0 | 0 | 75 | T/S | Per | own |
| 7/30/97 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E6 | MS | M | 42 | 0 | 0 | 0 | 132 | Fdprp | unk | n/a |
| 8/4/97 | anch | upkp | $147 | D | Lan | CV | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | 14 | Maint | Per | own |
| 8/7/97 | inpt | upkp | $147 | D | Pac | DD | N | Act | E2 | FA | M | 23 | 0 | 0 | 0 | 8 | T/S | Per | PPE |
| 8/8/97 | u/w | ISE | $147 | D | Lan | AS | N | Act | E3 | SH | F | 21 | 0 | 0 | 0 | 1 | Dishes | Per | own |
| 8/12/97 | inpt | upkp | $147 | D | Lan | AO | N | Act | E3 | FN | M | 21 | 0 | 0 | 0 | 1 | Maint | Per | PPE |
| 8/13/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E4 | HT | F | 28 | 0 | 0 | 0 | 12 | Weld | Per | PPE |
| 8/15/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | MS | M | 36 | 0 | 0 | 0 | 108 | T/S | Per | Tag |
| 8/15/97 | inpt | upkp | $460 | C | Lan | MHC | N | Act | E5 | MN | M | 26 | 0 | 0 | 1 | - | Maint | Per | Tag |
| 8/16/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 23 | 0 | 0 | 0 | - | Maint | Per | Tag |
| 8/17/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E4 | MM | F | 31 | 0 | 0 | 0 | 24 | T/S | Per | both |
| 8/18/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | MM | M | 23 | 0 | 0 | 0 | 1 | Wtch | Per | Tag |
| 8/19/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | MS | M | - | 0 | 0 | 0 | - | Fdprp | Mat | n/a |
| 8/20/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | 4 | Wtch | Per | own |
| 8/21/97 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E4 | EM | M | 29 | 0 | 0 | 0 | 20 | Maint | Per | Tag |
| 8/21/97 | u/w | flops | $147 | D | Lan | CVN | N | Act | E5 | AT | M | 22 | 0 | 0 | 0 | 3 | Wtch | unk | n/a |
| 8/21/97 | u/w | ISE | $147 | D | Lan | FFG | N | Act | E4 | GSE | M | 28 | 0 | 0 | 0 | 12 | Wtch | Mat | n/a |
| 8/22/97 | inpt | upkp | $147 | D | Lan | CG | N | Act | E4 | TM | M | 25 | 0 | 0 | 0 | - | PMS | Per | own |
| 8/26/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | MM | M | 24 | 0 | 0 | 0 | 70 | PMS | Per | PPE |
| 8/26/97 | u/w | ISE | $147 | D | Pac | DD | N | Act | E3 | QM | M | 22 | 0 | 0 | 0 | 24 | Wtch | Mat | n/a |
| 8/27/97 | inpt | upkp | $147 | D | Lan | LPD | N | Act | E6 | HT | M | 32 | 0 | 0 | 0 | 240 | Weld | Per | PPE |
| 8/27/97 | u/w | flops | $147 | D | Lan | CV | N | Act | E4 | AT | M | 24 | 0 | 0 | 0 | 3 | Wtch | Per | oth |
| 8/28/97 | u/w | flops | $147 | D | Lan | CV | N | Act | E5 | AS | M | 40 | 0 | 0 | 0 | 42 | T/S | Per | Tag |
| 8/29/97 | inpt | upkp | $147 | D | Lan | AS | N | TAR | E3 | EM | M | 21 | 0 | 0 | 0 | 18 | Maint | Per | both |
| 8/31/97 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E5 | EN | M | 30 | 0 | 0 | 0 | 24 | Wtch | Mat | n/a |
| 9/1/97 | yard | upkp | $147 | D | Pac | CVN | N | Act | E3 | ABH | M | 20 | 0 | 0 | 0 | 4 | T/S | Per | Tag |
| 9/2/97 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E4 | MM | F | 26 | 0 | 0 | 0 | 2 | Hsekp | Per | PPE |
| 9/2/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | MS | M | 19 | 0 | 0 | 0 | 5 | Fdprp | Per | own |
| 9/2/97 | u/w | ISE | $147 | D | Pac | AOE | N | Act | E5 | BM | M | 30 | 0 | 0 | 0 | 4 | Maint | Per | oth |
| 9/3/97 | inpt | upkp | $147 | D | Lan | CVN | N | Act | E3 | PH | F | 23 | 0 | 0 | 0 | 17 | Maint | Per | oth |
| 9/3/97 | u/w | ISE | $147 | D | Pac | DD | N | Act | E5 | EM | M | 32 | 0 | 0 | 0 | 144 | T/S | Per | both |
| 9/5/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E3 | EM | M | 21 | 0 | 0 | 0 | 12 | Maint | Per | own |
| 9/5/97 | u/w | ISE | $147 | D | Lan | LHD | N | Act | E2 | FA | M | 19 | 0 | 0 | 0 | 2 | Hsekp | Per | Tag |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/6/97 | u/w | ISE | $147 | D | Lan | AO | N | Act | E2 | MM | M | 22 | 0 | 0 | 0 | 1 | Hsekp | Per | own |
| 9/7/97 | yard | ovhl | $147 | D | Lan | LHA | N | Act | E3 | OS | M | 20 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 9/8/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E5 | AS | M | 34 | 0 | 0 | 0 | 6 | T/S | Per | Tag |
| 9/8/97 | u/w | ISE | $147 | D | Pac | DDG | N | Act | E4 | EM | M | 25 | 0 | 0 | 0 | 60 | T/S | Per | PPE |
| 9/9/97 | yard | ovhl | $147 | D | Lan | DDG | N | Act | E6 | MS | M | 38 | 0 | 0 | 0 | 42 | Hsekp | Per | Tag |
| 9/9/97 | u/w | ISE | $147 | D | Lan | FFG | N | Act | O3 | LT | M | 31 | 0 | 0 | 0 | 7 | Train | Per | own |
| 9/11/97 | u/w | ISE | $147 | D | Lan | DDG | N | Act | E6 | OS | M | 30 | 0 | 0 | 0 | 132 | Maint | Mat | n/a |
| 9/11/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | AO | M | 17 | 0 | 0 | 0 | 3 | Wtch | Per | own |
| 9/14/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | SN | M | 19 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 9/16/97 | inpt | upkp | $147 | D | Pac | LPD | N | Act | E4 | MM | M | 21 | 0 | 0 | 0 | 22 | Maint | Per | Tag |
| 9/18/97 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E3 | PH | M | 22 | 0 | 0 | 0 | 3 | Hsekp | Per | own |
| 9/22/97 | inpt | upkp | $147 | D | Lan | MCS | N | Act | E3 | AN | M | 21 | 0 | 0 | 0 | - | T/S | Per | Tag |
| 9/23/97 | inpt | upkp | $147 | D | Pac | CG | N | Act | E7 | EM | M | 37 | 0 | 0 | 0 | 215 | Inspt | Per | PPE |
| 9/23/97 | u/w | ISE | $147 | D | Lan | CV | N | Act | E3 | AT | M | 20 | 0 | 0 | 0 | 12 | Hsekp | Per | own |
| 9/24/97 | u/w | ISE | $147 | D | Pac | CVN | N | Act | E5 | ET | M | 20 | 0 | 0 | 0 | - | Train | Per | oth |
| 9/26/97 | inpt | upkp | $147 | D | Pac | CV | N | Act | E4 | ET | M | 21 | 0 | 0 | 0 | 12 | Maint | Per | Tag |
| 9/27/97 | u/w | ISE | $147 | D | Lan | CG | N | Act | E4 | STG | M | 21 | 0 | 0 | 0 | 24 | PMS | Per | PPE |
| 9/30/97 | inpt | upkp | $147 | D | Pac | FFG | N | Act | E4 | EM | M | 24 | 0 | 0 | 0 | 72 | T/S | Per | Tag |
| 10/1/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | SA | M | 25 | 0 | 0 | 0 | 12 | Maint | Mat | n/a |
| 10/1/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E4 | DP | M | 22 | 0 | 0 | 0 | 24 | Maint | Per | Tag |
| 10/8/97 | u/w | ISE | $460 | C | Lan | LHD | N | Act | E6 | AT | M | - | 0 | 0 | 1 | 12 | Maint | Per | own |
| 10/9/97 | inpt | upkp | $147 | D | Lan | LCC | N | Act | O3 | LT | M | 39 | 0 | 0 | 0 | - | Maint | unk | n/a |
| 10/10/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E6 | ET | M | 37 | 0 | 0 | 0 | 144 | Hsekp | Per | own |
| 10/14/97 | u/w | ISE | $147 | D | Pac | CG | N | Act | E2 | OS | M | 20 | 0 | 0 | 0 | 8 | Wtch | Per | own |
| 10/15/97 | yard | upkp | $147 | D | Lan | CG | N | Act | E3 | FN | M | 19 | 0 | 0 | 0 | 18 | PMS | Per | Tag |
| 10/15/97 | yard | upkp | $147 | D | Pac | FFG | N | Act | E5 | EW | M | 20 | 0 | 0 | 0 | 38 | Maint | Per | own |
| 10/15/97 | u/w | ISE | $147 | D | Lan | AS | N | Act | E1 | MS | F | 23 | 0 | 0 | 0 | 2 | PMS | Per | Tag |
| 10/20/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E4 | EM | M | 29 | 0 | 0 | 0 | 144 | Maint | Per | Tag |
| 10/22/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E1 | ET | M | 22 | 0 | 0 | 0 | 42 | Hsekp | Per | oth |
| 10/22/97 | u/w | ISE | $147 | D | Lan | AGF | N | Act | E3 | MM | M | 22 | 0 | 0 | 0 | 12 | Maint | Per | both |
| 10/24/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | AT | M | 22 | 0 | 0 | 0 | 6 | Maint | Per | own |
| 10/24/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 22 | 0 | 0 | 0 | 12 | PMS | Per | own |
| 10/27/97 | u/w | ISE | $147 | D | Pac | CG | N | Act | E2 | ET | M | 21 | 0 | 0 | 0 | 13 | T/S | Per | Tag |
| 10/29/97 | yard | upkp | $147 | D | Pac | DD | N | Act | E4 | FC | M | 23 | 0 | 0 | 0 | 36 | DC | Per | PPE |
| 10/30/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | DC | M | 20 | 0 | 0 | 0 | 12 | PMS | Per | Tag |
| 11/6/97 | u/w | ISE | $147 | D | Pac | LPD | N | Act | E5 | ET | M | 24 | 0 | 0 | 0 | 42 | PMS | Per | PPE |
| 11/7/97 | u/w | ISE | $230 | D | Lan | LSD | N | Act | E4 | EN | M | 21 | 0 | 1 | 0 | 12 | Maint | Per | PPE |
| 11/9/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | AMH | M | 23 | 0 | 0 | 0 | 18 | Maint | Per | own |
| 11/10/97 | u/w | s/a | $147 | D | Lan | FFG | N | Act | E4 | BM | M | 23 | 0 | 0 | 0 | 36 | Maint | Mat | n/a |
| 11/12/97 | inpt | upkp | $147 | D | Lan | AO | N | Act | E5 | MM | F | 33 | 0 | 0 | 0 | 24 | PMS | unk | n/a |
| 11/12/97 | u/w | ISE | $147 | D | Pac | LPD | N | Act | E3 | SN | M | 20 | 0 | 0 | 0 | - | Maint | Per | own |
| 11/13/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 22 | 0 | 0 | 0 | 12 | T/S | Per | own |
| 11/14/97 | u/w | ISE | $147 | D | Pac | CG | N | Act | E5 | RM | M | 28 | 0 | 0 | 0 | 7 | Maint | Mat | n/a |
| 11/14/97 | u/w | flops | $147 | D | Lan | DD | N | Act | E4 | AMH | M | 24 | 0 | 0 | 0 | 72 | Maint | Per | own |
| 11/14/97 | inpt | upkp | $147 | D | Pac | DDG | N | Act | E4 | RM | M | 26 | 0 | 0 | 0 | 2 | Dishes | Per | own |
| 11/16/97 | u/w | ISE | $147 | D | Lan | DDG | N | Act | E5 | GSM | M | 22 | 0 | 0 | 0 | 44 | Maint | Per | both |
| 11/16/97 | u/w | ISE | $147 | D | Lan | DD | N | Act | E4 | BM | M | 24 | 0 | 0 | 0 | 42 | Maint | Per | own |
| 11/16/97 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E4 | ET | M | 21 | 0 | 0 | 0 | 24 | T/S | Per | own |
| 11/17/97 | inpt | upkp | $147 | D | Lan | AS | N | Act | E2 | SA | M | - | 0 | 0 | 0 | 3 | Wtch | Per | own |
| 11/18/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | MM | M | 28 | 0 | 0 | 0 | 24 | Wtch | Per | Tag |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11/18/97 | inpt | upkp | $147 | D | Pac | LSD | N | Act | E4 | BM | M | 26 | 0 | 0 | 0 | 19 | Maint | Per | own |
| 11/27/97 | inpt | upkp | $147 | D | Pac | CG | N | Act | E3 | FN | M | 20 | 0 | 0 | 0 | 21 | Wtch | Per | own |
| 11/28/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E3 | FN | M | 23 | 0 | 0 | 0 | 24 | Maint | Mat | n/a |
| 11/28/97 | inpt | upkp | $147 | D | Lan | FFG | N | Act | E4 | EN | M | 20 | 0 | 0 | 0 | 21 | Maint | Mat | n/a |
| 12/1/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | MS | M | 35 | 0 | 0 | 0 | 5 | Fdprp | Per | oth |
| 12/2/97 | inpt | upkp | $147 | D | Lan | DDG | N | Act | E6 | DC | M | 33 | 0 | 0 | 0 | 132 | Maint | Per | own |
| 12/4/97 | inpt | upkp | $147 | D | Lan | DD | N | Act | E7 | EM | M | 38 | 0 | 0 | 0 | 228 | Inspt | Per | Tag |
| 12/4/97 | inpt | ISE | $147 | D | Lan | AS | N | Act | WO3 | CWO | M | - | 0 | 0 | 0 | 244 | Train | Per | own |
| 12/4/97 | u/w | ISE | $147 | D | Pac | CG | N | Act | E4 | GSM | M | 22 | 0 | 0 | 0 | 40 | Hsekp | Per | both |
| 12/5/97 | u/w | flops | $147 | D | Pac | CVN | N | Act | E3 | IC | M | 21 | 0 | 0 | 0 | 17 | T/S | Per | both |
| 12/5/97 | u/w | ISE | $147 | D | Pac | LHA | N | Act | E3 | SN | M | 24 | 0 | 0 | 0 | 42 | Hsekp | Per | Tag |
| 12/5/97 | u/w | flops | $147 | D | Pac | CVN | N | Act | O2 | LTjg | M | 24 | 0 | 0 | 0 | 20 | Wtch | Per | oth |
| 12/5/97 | u/w | flops | $147 | D | Pac | CVN | N | Act | O3 | LT | M | 36 | 0 | 0 | 0 | 120 | Wtch | Per | oth |
| 12/9/97 | u/w | ISE | $147 | D | Lan | DD | N | Act | E4 | ET | M | 22 | 0 | 0 | 0 | 28 | T/S | Per | PPE |
| 12/10/97 | u/w | ISE | $147 | D | Pac | CV | N | Act | E4 | DC | M | 23 | 0 | 0 | 0 | 8 | T/S | Per | both |
| 12/11/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E4 | HT | M | - | 0 | 0 | 0 | 60 | Weld | Per | PPE |
| 12/13/97 | u/w | flops | $147 | D | Lan | CVN | N | Act | E2 | AT | M | - | 0 | 0 | 0 | 6 | Wtch | Per | own |
| 12/15/97 | inpt | upkp | $147 | D | Lan | LHD | N | Act | E5 | CT | F | 27 | 0 | 0 | 0 | 1 | PMS | Per | both |
| 12/16/97 | inpt | upkp | $147 | D | Pac | CV | N | Act | E3 | RM | M | 20 | 0 | 0 | 0 | 6 | T/S | Mat | n/a |
| 12/18/97 | inpt | upkp | $147 | D | Lan | CG | N | Act | E6 | FC | M | 30 | 0 | 0 | 0 | 5 | T/S | Per | PPE |
| 12/18/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E3 | AE | M | 21 | 0 | 0 | 0 | 3 | Maint | Per | own |
| 12/23/97 | u/w | ISE | $147 | D | Lan | CVN | M | Act | E4 | CPL | M | 24 | 0 | 0 | 0 | 36 | T/S | Per | PPE |
| 12/27/97 | u/w | ISE | $147 | D | Pac | DD | N | Act | E5 | CTM | M | 23 | 0 | 0 | 0 | 60 | T/S | Per | both |
| 12/29/97 | inpt | upkp | $147 | D | Pac | AS | N | Act | E3 | HT | M | 21 | 0 | 0 | 0 | 5 | Wtch | unk | n/a |
| 12/29/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E4 | AT | M | 22 | 0 | 0 | 0 | 24 | T/S | Per | Tag |
| 12/29/97 | u/w | ISE | $147 | D | Lan | CVN | N | Act | E5 | AT | M | 23 | 0 | 0 | 0 | 24 | T/S | Per | both |
| 12/30/97 | u/w | ISE | $147 | D | Lan | CG | N | Act | E5 | FC | M | 22 | 0 | 0 | 0 | 41 | Maint | Per | own |

# APPENDIX C. DOD COST STANDARD TABLES AND COST ESTIMATION TECHNIQUES

Department of Defense (DOD) Instruction 6055.7, April 10, 1989, "Mishap Investigation, Reporting, and Recordkeeping" provides guidance for investigation, reporting, and recordkeeping on mishaps and occupational illnesses. Enclosure 5, Attachment 1 of this instruction provides the "Cost Standard Table" for DOD agencies to determine personnel injury costs (DOD, 1989). Table C1 provides a condensed version of this table applicable to U.S. military personnel.

| CY89$ | Submarine and/or Flying Officer | Other Officers | Enlisted Personnel, Cadets |
|---|---|---|---|
| | | | |
| Fatality | $1,100,000 | $395,000 | $125,000 |
| (flight crew member) | | | $270,000 |
| | | | |
| Permanent Total Disability | $1,300,000 | $845,000 | $500,000 |
| | | | |
| Permanent Partial Disability | $210,000 | $145,000 | $115,000 |
| | | | |
| Lost Time Case (per day) | $425 | $425 | $375 |
| | | | |
| Days Hospitalized (perday) | $466 | $466 | $466 |
| | | | |
| No Lost Time Case (per day) | $120 | $120 | $120 |

**Table C1. DOD Cost Standard Table for Personnel Injury (CY89$)**

Cost figures for table C1 were provided in Constant Year 1989 (CY89) dollars. For the purpose of this study cost figures were converted to CY95 dollars to adjust for inflation and provide a more current estimate of personnel injury cost. The electrical shock mishap database contains data on mishaps from 1995 through 1997. Personnel injury cost figures for each year are calculated in CY95 dollars in order to provide a common Base Year for future year cost estimates. Inflation adjustments were made using MPN inflation indices provided by the Naval Center for Cost Analysis (NCCA, 1998).

Table C2 provides cost figures in CY95 dollars used for personnel injury cost estimation in this study. Cost for personnel injuries involving restricted activity days were calculated at half the cost of the lost time cases.

| CY95$ | Submarine and/or Flying Officer | Other Officers | Enlisted Personnel, Cadets |
|---|---|---|---|
| | | | |
| **Fatality** | $1,348,921 | $484,385 | $153,286 |
| **(flight crew member)** | | | $331,099 |
| | | | |
| **Permanent Total Disability** | $1,594,180 | $1,036,217 | $613,146 |
| | | | |
| **Permanent Partial Disability** | $257,521 | $177,812 | $141,024 |
| | | | |
| **Lost Time Case (per day)** | $521 | $521 | $460 |
| | | | |
| **Days Hospitalized (perday)** | $571 | $571 | $571 |
| | | | |
| **No Lost Time Case (per day)** | $147 | $147 | $147 |

**Table C2. DOD Cost Standard Table for Personnel Injury (CY95$)**

## APPENDIX D. ELECTRICAL SHOCK MISHAP EVENT SUMMARY

| Month | 1995 | 1996 | 1997 | Totals |
|---|---|---|---|---|
| January | 22 | 23 | 25 | 70 |
| February | 27 | 23 | 30 | 80 |
| March | 18 | 26 | 27 | 71 |
| April | 20 | 27 | 24 | 71 |
| May | 30 | 28 | 25 | 83 |
| June | 31 | 19 | 39 | 89 |
| July | 35 | 18 | 21 | 74 |
| August | 33 | 27 | 23 | 83 |
| September | 29 | 27 | 26 | 82 |
| October | 31 | 31 | 17 | 79 |
| November | 16 | 20 | 19 | 55 |
| December | 29 | 9 | 22 | 60 |
| Totals | 321 | 278 | 298 | 897 |

**Table D1. Electrical Shock Mishap Event Summary**

| Month | 1995 | 1996 | 1997 | Totals |
|---|---|---|---|---|
| January | 21 | 22 | 22 | 65 |
| February | 22 | 22 | 27 | 71 |
| March | 13 | 22 | 23 | 58 |
| April | 17 | 23 | 19 | 59 |
| May | 28 | 23 | 21 | 72 |
| June | 22 | 14 | 32 | 68 |
| July | 26 | 16 | 18 | 60 |
| August | 30 | 24 | 18 | 72 |
| September | 22 | 24 | 25 | 71 |
| October | 29 | 26 | 15 | 70 |
| November | 14 | 18 | 14 | 46 |
| December | 26 | 8 | 20 | 54 |
| Totals | 270 | 242 | 254 | 766 |

**Table D2. Electrical Shock Human Factors Mishap Event Summary**

| Month | 1995 | 1996 | 1997 | Totals |
|---|---|---|---|---|
| January | 1 | 1 | 3 | 5 |
| February | 5 | 1 | 3 | 9 |
| March | 5 | 4 | 4 | 13 |
| April | 3 | 4 | 5 | 12 |
| May | 2 | 5 | 4 | 11 |
| June | 9 | 5 | 7 | 21 |
| July | 9 | 2 | 3 | 14 |
| August | 3 | 3 | 5 | 11 |
| September | 7 | 3 | 1 | 11 |
| October | 2 | 5 | 2 | 9 |
| November | 2 | 2 | 5 | 9 |
| December | 3 | 1 | 2 | 6 |
| Totals | 51 | 36 | 44 | 131 |

**Table D3. Electrical Shock Non-Human Factors Mishap Event Summary**

# APPENDIX E. COST DISTRIBUTION COMPUTER PROGRAM

```
function(costs, lambda){
#
# Function for estimating the distribution of electrical shock mishap event costs
#
        total <- rep(0, 1000)
        for(i in 1:1000) {
                n <- rpois(1, lambda)
                estcost <- sample(costs[, 1], size = n, replace = T)
                total[i] <- sum(estcost)
        }
        dput(total, file = "costdata")
}
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